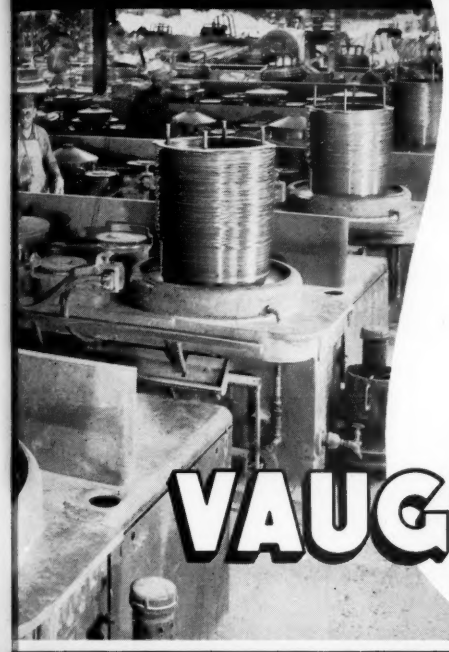
SEPTEMBER, 1946

WIRE AND WIRE PRODUCTS



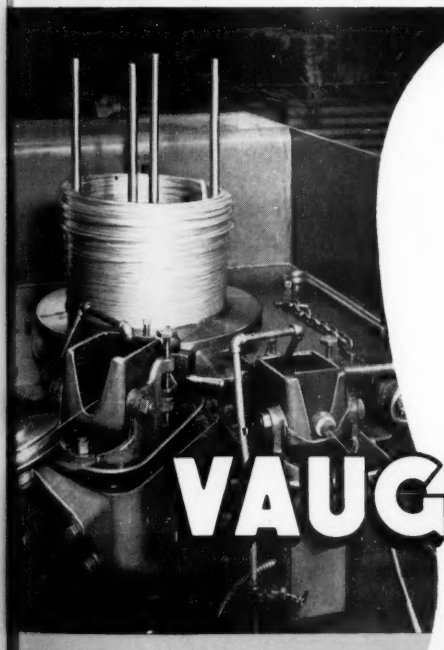
USE

Today's Best

IN WIRE DRAWING MACHINERY

FOR TODAY'S TOUGH WIRE PRODUCTION REQUIREMENTS

VAUGHN MOTOBLOX



The exacting demands of present-day wire markets require maximum productivity and flexibility in your wire drawing equipment—qualities provided in superlative degree by modern, high-speed Vaughn Machinery.

Compare the performance you need now, with the performance you get when the Vaughn nameplate is on your production equipment. We'll be glad to give you the facts!

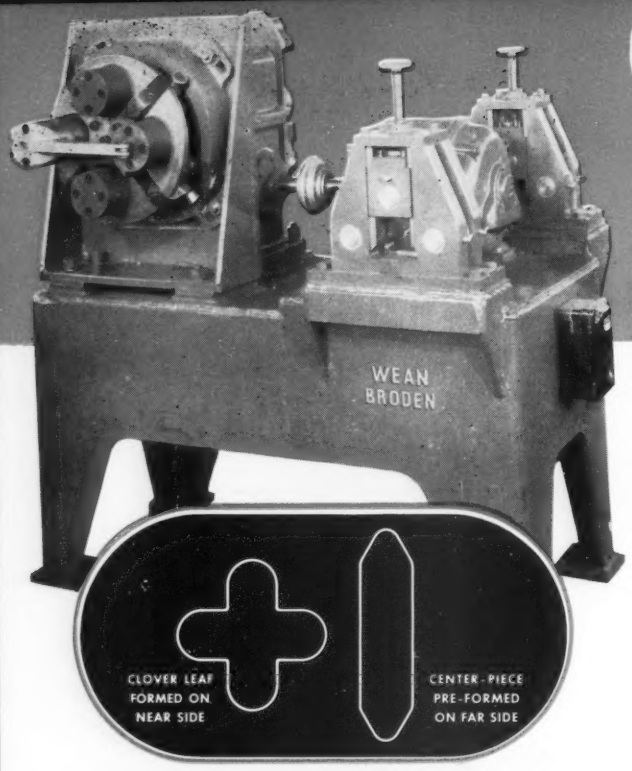
THE VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

VAUGHN MOTOBLOC

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION



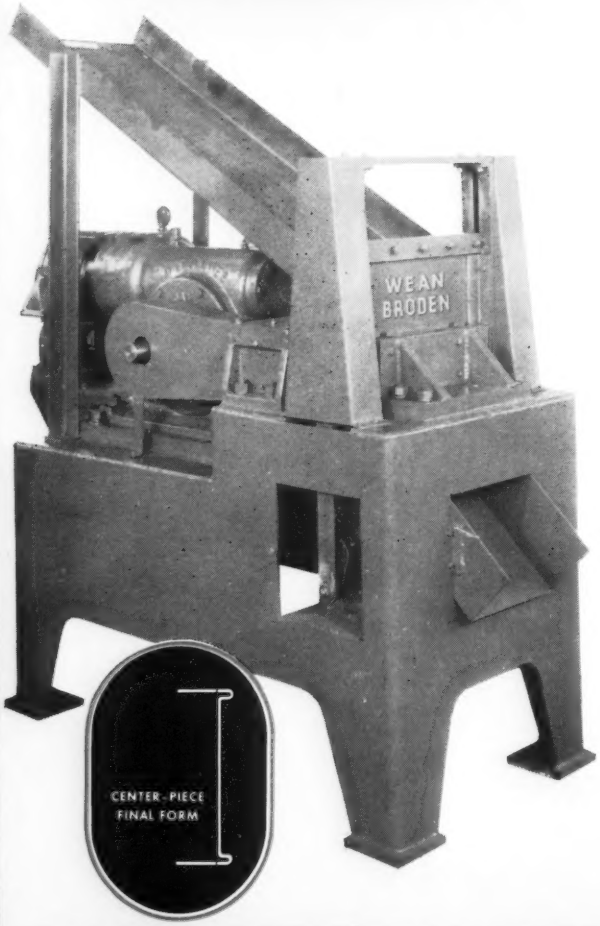
WEAN • BRODEN

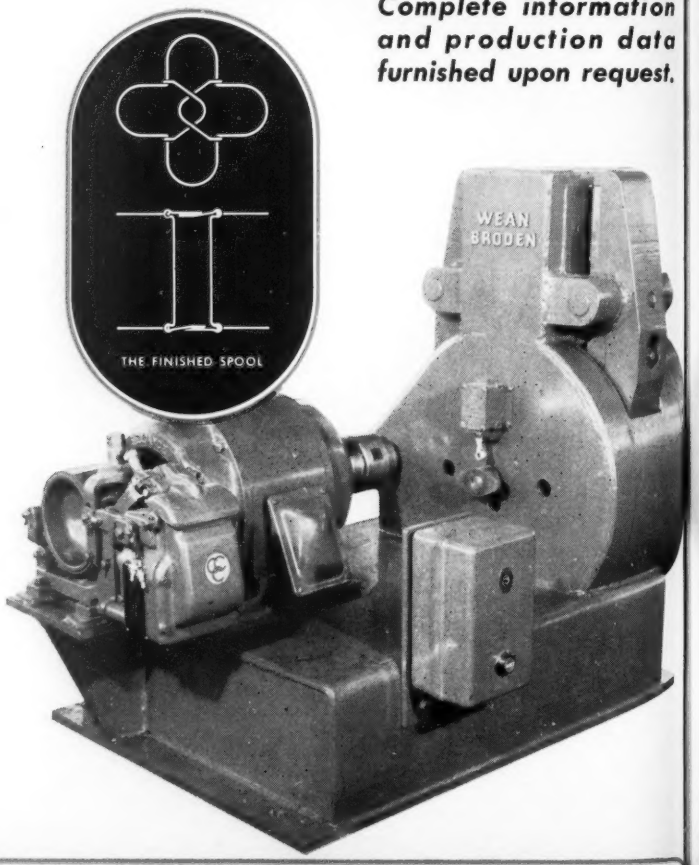
MACHINES FOR MAKING *Spools*

. . . Now for the FIRST TIME automatic machines are available for the making of standard spools that will fit any barbed wire machine.

These machines handle No. 6 gauge wire.

Complete information and production data furnished upon request.





The **BRODEN CONSTRUCTION CO** *Inc.* *Cleveland Ohio*

A Subsidiary Company of

The **WEAN ENGINEERING** *Company Inc.* *Warren Ohio*

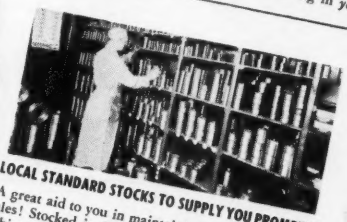
Look at the *EXTRA SERVICES* that go with your CARBOLOY (TRADEMARK) CEMENTED CARBIDE Die Orders!

APPROVED DIE ROOM EQUIPMENT

Die finishing and servicing equipment made or recommended by Carboloy assures you of an efficient die room. Combine well-trained personnel with high-efficiency equipment and it spells fast die finishing in *your* mill.

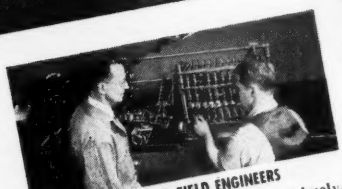
FREE TRAINING OF YOUR PERSONNEL

In Carboloy's Die Training School in Detroit, your die room personnel receive thorough training in carbide die application and maintenance methods. Up-to-the-minute training for newcomers or seasoned veterans!



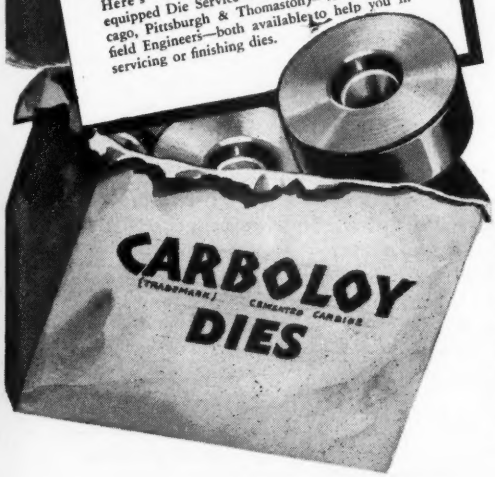
LOCAL STANDARD STOCKS TO SUPPLY YOU PROMPTLY

A great aid to you in maintaining production schedules! Stocked in Detroit, Los Angeles, Pittsburgh, Chicago and Thomaston, Conn.—assuring speedy delivery in metal-working areas coast-to-coast.



SERVICE CENTERS AND FIELD ENGINEERS

Here's "double-help" for you: Completely equipped Die Service Centers (in Detroit, Chicago, Pittsburgh & Thomaston)—AND expert field Engineers—both available to help you in servicing or finishing dies.



"COMPLETE PACKAGE" DIE SERVICE MEANS TOP-QUALITY DIES PLUS 4 VALUABLE "BONUS" SERVICES!

When you can get 4 valuable extra services along with your die order—at not one cent of added cost—isn't it good business to do it?

Especially when you consider that Carboloy Cemented Carbide Dies assure you of *unusually long die life—closer tolerances on drawn parts—fewer "rejects"—lower cost per piece—and high surface finish.*

And remember: where maximum nib strength is needed, Carboloy* "forged casing" dies are the answer. By *forging* the steel casing, the steel flows around the carbide nib, anchoring it securely.

Carboloy Cemented Carbide Dies are available in a complete range of sizes and shapes for drawing, sizing, extruding. Contact your nearest Carboloy office, or write:

WRITE TODAY FOR YOUR DIE MANUAL!

It's packed with handy tips, illustrated with photos and diagrams. Gives you expert advice on all die problems—right at hand in your mill. Send for yours today—it's *FREE!*

CARBOLOY COMPANY, INC., 11171 E. 8 Mile Blvd., Detroit 32, Michigan
Chicago • Cleveland • Detroit • Houston • Los Angeles • Milwaukee • Newark • Philadelphia Pittsburgh • Thomaston, Conn.

Specify* CARBOLOY (TRADEMARK) CEMENTED CARBIDE { For "Complete Package" Die Service

Authorized Distributors: **Hartley Wire Die Co., Thomaston, Conn. • Michigan Wire Die Co., Detroit, Michigan**

RUST-FIGHTER

Rust meets its match in the sturdy, rust-defying bethanized coating.

This bright bethanized coating is 99.9 per cent pure zinc--and it's pure all the way through to the steel base wire. It's uniform, too. Locked to the steel by an advanced electrolytic process, the coating is perfectly uniform in depth, not only around but also along the wire. Rust-inviting thin spots in the coating simply do not exist.

What about ductility? The bethanized coating is so tightly adherent, so ductile, that it can stand practically any forming operation used by wire fabricators. Bending . . . twisting . . . drawing to fine gauge—bethanized wire takes such operations in its stride, without any sign of peeling or chipping.

Because of its purity and uniformity, any bethanized wire is highly resistant to corrosion. Yet, wherever exceptional protection against corrosion is called for, bethanized coatings can be applied in extra-heavy weights, up to three times as heavy as those specified in conventional Type 3 galvanizing.

If you have a job for wire calling for ability to endure severe forming operations and resist rust, we suggest that you give bethanized wire a tryout.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export distributor: Bethlehem Steel Export Corporation, New York

★ Bethanized Wire ★

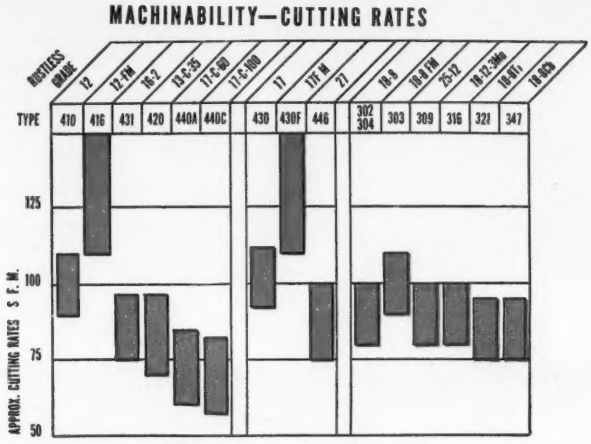
BETHLEHEM STEEL

WIRE & WIRE PRODUCTS, Vol. 21, No. 9, September, 1946. Publication Office, 61 Cliff St., New York 7, N. Y. Executive Office, 300 Main St., Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec. and Treas. Subscription price: U. S., $5.00; Canada, $5.00 per year, 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, June 14, 1946, at the Post Office, New York, N. Y., under Act of March 3, 1879.

RUSTLESS DATA SHEET NO. 6

Corrosion Resistance plus Machinability

One of the Many Combinations of Properties Offered by Stainless Steels



• Are Stainless Steels difficult to machine?

Thousands of production machine shops throughout the United States are making stainless steel products economically to production schedules. In these shops stainless steels are turned on automatic screw machines, single and multiple spindle automatics, turret lathes, and Swiss automatics . . . are milled, drilled, reamed, tapped and threaded. In many cases smooth finishes and close tolerances are mandatory. It is estimated that during the past year 130 to 150 million pounds of stainless steels were used exclusively in machining operations. At the present time more stainless steel bar stock is fabricated by machining than by all other methods combined. On a large scale, over a period of many years, actual experience has demonstrated that stainless steels can be machined easily and economically . . . that machining stainless steel is not difficult—only different.

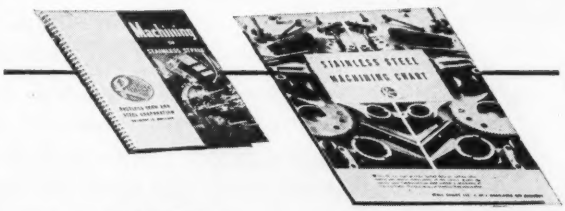
There are many grades of stainless steel, each designed for a particular combination of fabricating conditions and service requirements. All are machinable. However, when cutting rates are most important, it is advisable to take advantage of the free-cutting characteristics of the free-machining grades. Stainless steel types 416 (Rustless 12 FM), 430 F (Rustless 17 FM) and 303 (Rustless 18-8 FM) have been particularly adapted for machining operations by additions of free-cutting elements—sulphur, selenium, and phosphorous. The pronounced effect of these additions on cutting rates is clearly shown on the above chart. With the free-machining grades cutting rates approach 85% of those used on Bessemer screw stock.

In addition to good machinability, a variety of corrosive conditions may be successfully combated. Type 416 is used for ordinary corrosive conditions. Type 430 F provides excellent resistance against more strongly corrosive conditions. Type 303, the free-machining counterpart of 18-8 stainless, is used where superior heat and corrosion resistance is required.

Rustless specializes in stainless steels and over a period of years has made an extensive investigation of cutting rates, tool materials, lubricants, and the effects of special tooling for all grades and operations. This experience has proved extremely valuable to many engineers, metallurgists, and shopmen concerned with machining stainless steels. If you wish to know more about machining stainless steel . . . call on Rustless.

Write for Rustless' machining literature:

1. **Comprehensive Reference Booklet—84 pages**
2. **Chart of Condensed Machining Information—File Size or Wall Size**



SALES OFFICES:
ATLANTA • BALTIMORE • BERKELEY • BOSTON
BUFFALO • CHATTANOOGA • CHICAGO
CINCINNATI • CLEVELAND • COLUMBUS
DALLAS • DAYTON • DETROIT • HOUSTON
INDIANAPOLIS • KANSAS CITY • LOS ANGELES
MILWAUKEE • MINNEAPOLIS • NEW YORK
PHILADELPHIA • PITTSBURGH • RICHMOND
ST. LOUIS • SOUTH BEND
DISTRIBUTORS IN PRINCIPAL CITIES

Rustless

DIVISION OF ARMCO

RUSTLESS IRON AND STEEL DIVISION

THE AMERICAN ROLLING MILL COMPANY

Baltimore 13, Maryland

STAINLESS STEEL SPECIALISTS

HAIRPIN PICKLING HOOK used in prominent steel plant for handling wire coils. Fabricated from standard mill forms of Monel by The Youngstown Welding & Engineering Company, Youngstown, O., this lightweight hook is ideal for heavy-duty service.

DESIGNED FOR LONG LIFE

Now you can have a lightweight pickling hook! One that's as strong as any you've ever used. One that's more corrosion-resistant than many heavier hooks. One that's designed for real economy.

Made of Monel* by **The Youngstown Welding & Engineering Company**, Youngstown, Ohio, the streamlined pickling hook illustrated here handles a 3000-pound load easily . . . and with enduring safety.

Monel resists the corrosive action of hot pickling acids. It has the high strength and toughness required by equipment that is subject to strain and stress. Monel hooks last despite bumps and jolts that fracture less ductile metals.

When balky, old-fashioned equipment stalls production or requires costly maintenance, there's a good chance that Youngstown can suggest an improved, lightweight design in Monel to meet your needs.

Why not write them — or us — for further information about economical, trouble-free pickling equipment? *Reg. U. S. Pat. Off.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N.Y.

MONEL... ONE OF THE INCO NICKEL ALLOYS

F. E. I. EQUIPMENT

Direct-Fired Cover Furnaces for annealing, spheroidizing, Normalizing and Bright annealing of wire, rods, coiled strip, flat sheets and tin plate.

For Heavy Coil Loads: Patented Convection Base, gives 2 to 4 times longer service.

For Wire, Bar and Tube Mills: Galvanizing, Patenting and Normalizing Furnaces.

For Pipe, Sheet, and Job Plants: Hot Dip Galvanizing Furnaces.

Car Type Furnaces, Rod Heating, Lead Quenching, Ladle Heating and Salt Bath Descaling Furnaces.

In steel and non-ferrous production, wherever heat treating is done on a large scale, skilled engineering service is essential to best results.

Among the many types of furnace equipment offering possibilities for any given application, the furnace engineer must, without favor or prejudice, and with thorough insight into comparative merits of different types, make recommendations with a single eye to obtaining for his client the utmost in performance.

Because of strict adherence to this principle and 30 years of specialization in production heating problems, F.E.I. engineers have been signally successful in serving many of America's outstanding producers of rod, wire, sheets, strip and shapes. These F.E.I. services are yours for the asking, without cost or obligation on your part. *Our recommendations are not limited to equipment of our own manufacture.*

Performance Records on the latest and most advanced types of F.E.I. equipment, installed in various plants of national prominence, are furnished on request. Some of these records show qualitative and quantitative results far beyond anything heretofore considered possible. Study the facts—they are most illuminating!

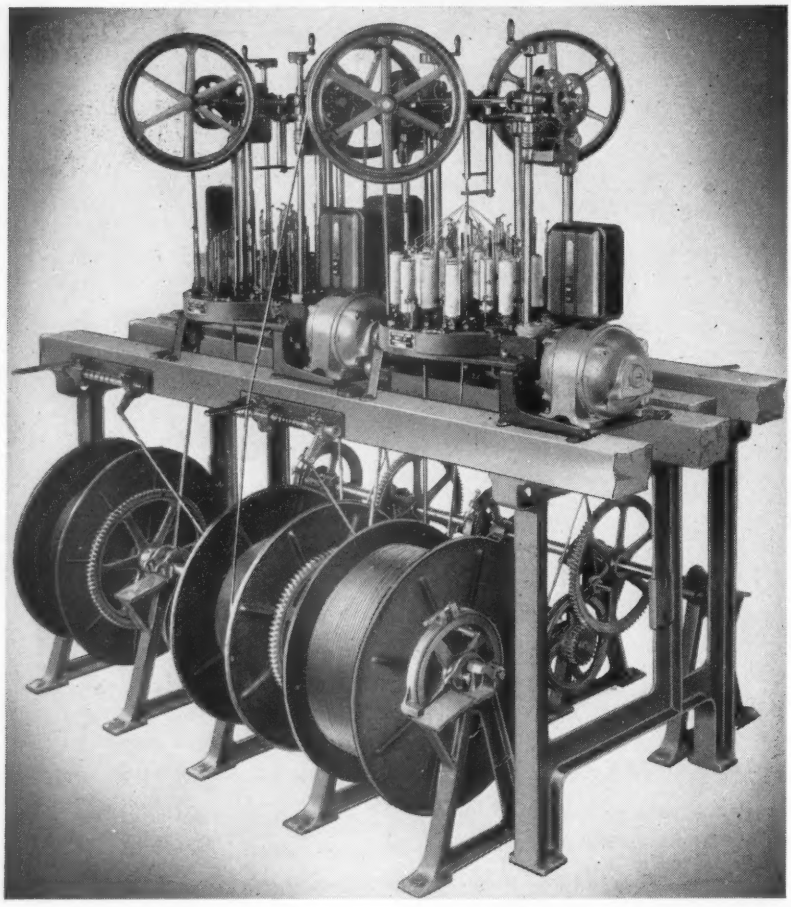
FURNACE ENGINEERS, Inc.

Foreign Representatives { FOR CANADA: Salem Engineering (Canada) Ltd. Toronto, Ont. / FOR EUROPE, ASIA, AFRICA: Salem Engineering Co. Ltd., Milford, Nr. Derby, England.

1551 WEST LIBERTY AVENUE ★ PITTSBURGH, PA.

BRAIDERS
FOR WIRE INSULATION
SIZE B-11

40%
INCREASE IN
YARN
CAPACITY
OVER
B-2 SIZE



INCREASED
OPERATING
EFFICIENCY

LOW
MAINTENANCE

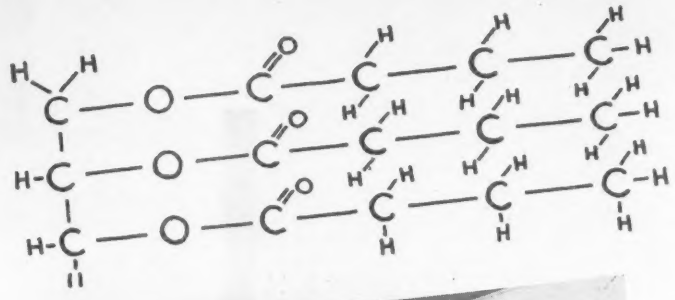
B-11 BRAIDERS, equipped with high speed spring tension carriers and thick plates, provide the economical means of covering wire.

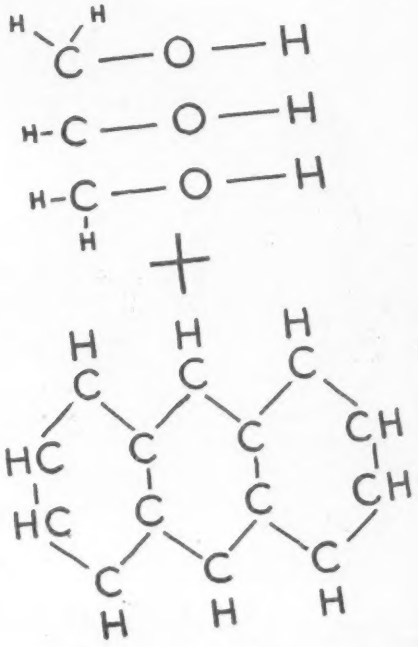
Whether your problem be that of a single braid covering or a triple covering for weatherproof wire, the B-11 BUTT BRAIDER will prove to be the most efficient solution.

WRITE FOR DETAILED DESCRIPTION

NEW ENGLAND BUTT COMPANY

ESTABLISHED 1842
304 PEARL STREET
PROVIDENCE 7, RHODE ISLAND, U. S. A.
JAMES DAY (MACHINERY) LTD., "FORD HOUSE," 88 REGENT ST., LONDON., W. I. ENGLAND





CHEMISTRY BY SPECIFICATION

THERE is more to Chemistry today than meets the eye. It is no longer a more or less hit or miss, trial by error method of testing now this combination, now that. Improved formulas are explored and achieved based on known structures, weights and movements of molecule and atom, and on skillful mathematical computations.

In the field of wire drawing lubrication lie possibilities for improvement that challenge the highest skill of industrial chemistry. We therefore give it our specialized attention and study, knowing that it is only by close application in this field that we can achieve the improvements you specify as essential to the desired success of your over-all wire-drawing operation.

We welcome these "calls by specification" upon our ingenuity and chemical skill. Do not hesitate to make your wire lubrication problems ours to solve as well. . . . Address Technical Department,

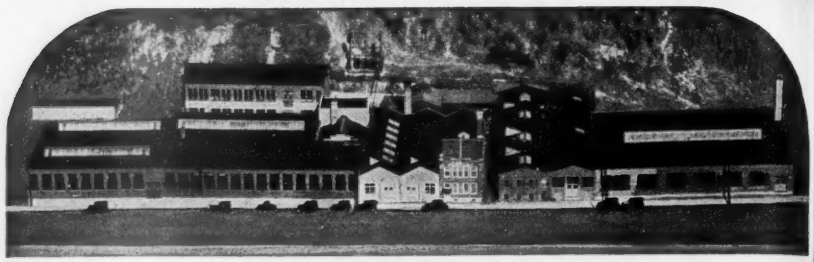
STANDARD INDUSTRIAL COMPOUNDS COMPANY

4600 W. Ferdinand Street, Chicago 44, Ill.

Standardize with Standard

Standardize with Standard

HUDCO



HUDSON WIRE CO. PLANT AT OSSINING, N. Y.

This plant is one of the most up-to-date and completely equipped plants in the world for the production of "HUDCO" fine wires in all metals.

ESTABLISHED IN 1902

HUDCO

WIRES FOR METAL SPRAYING

Pure lead, Lead Alloy, Pure Zinc, Zinc Alloy, Copper, Tin, High Brass, Low Brass, Solder Wire. High Conductivity, Electric Wire. Cadmium, Nickel Silver, Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel, Commercial Bronze, Brush Wires, Crimp and Straight, Brass, Steel, Nickel Silver, Copper and Phosphor Bronze.

HUDCO

FINE BARE WIRES

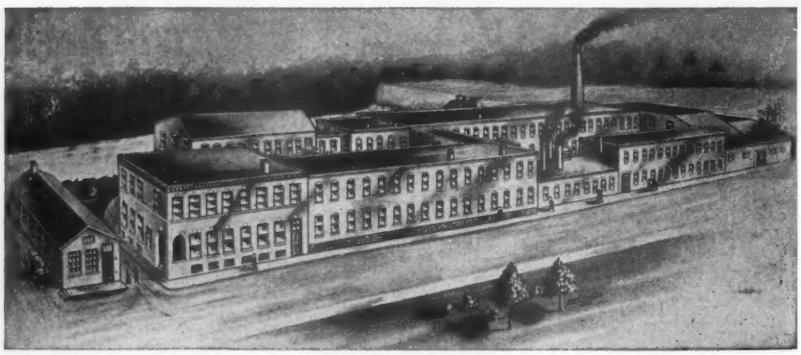
High Brass, Low Brass, Zinz 99.99+ and High Tensile Zinc, Commercial Bronze, Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Tinsel Lahns, Silver Plated Copper, False Gold and Copper. Cadmium, Nickel Silver, Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification, Metallic Fibre for Packing Purposes, Copper, Bronze, Zinc, Lead and Aluminum.

"HUDCO" specially processed Copper Wire for enamelling purposes is drawn from selected Copper, insuring the maximum conductivity. This is but one example of the use of the most advanced and approved materials and methods in our processing.

BETTER WIRE AT LOWER COST

Send Us Your Specifications and Let Us Quote Prices

HUDSON WIRE COMPANY • OSSINING, N. Y.



Winsted Division of HUDSON WIRE CO. at Winsted, Conn., modern and completely equiped enamelled wire plant for LEAKPROOF ENAMELLED WIRE and all standard and special coverings.

WINCO

"WINCO" enamelled wire is drawn from special selected copper, assuring perfect enamelling. All wire tested before shipment.

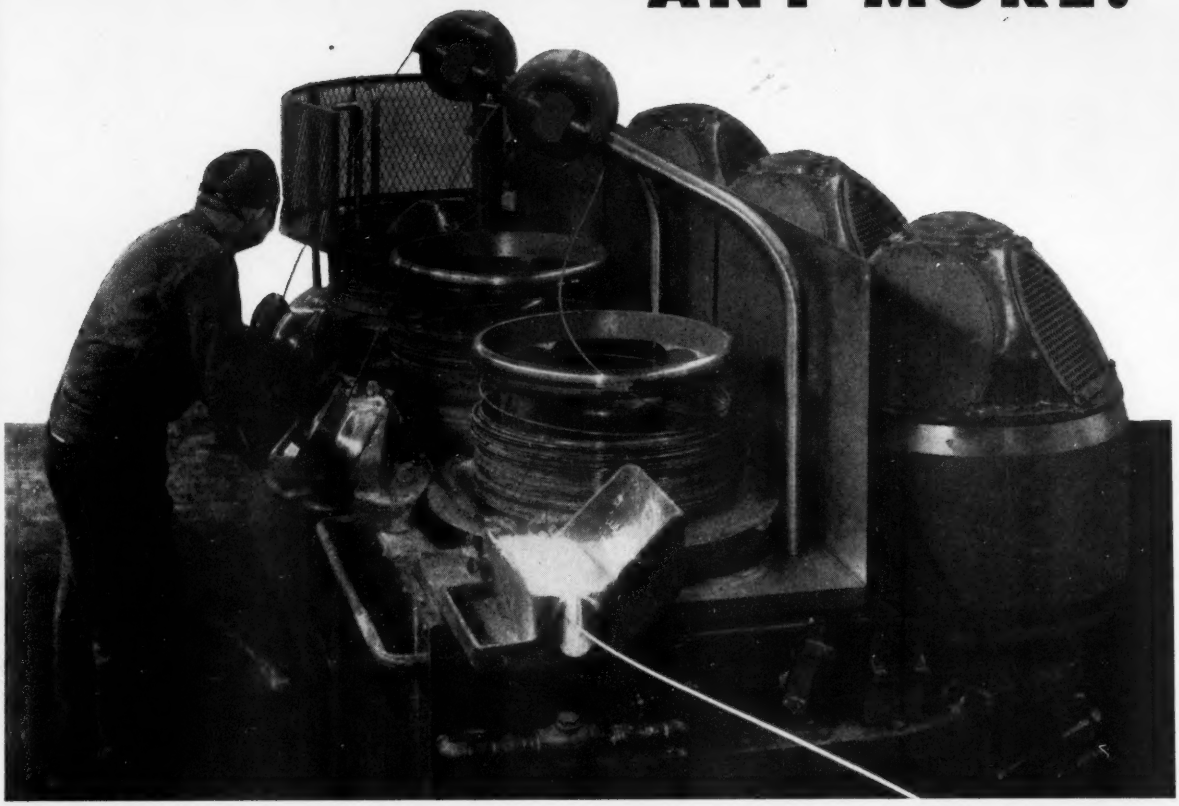
"WINCO" enamelled wire is available in all standard and special coverings made to meet exacting requirements.

Samples of LEAKPROOF and other enamelled wires sent on request

WINSTED DIVISION OF HUDSON WIRE COMPANY

WINSTED, CONN

YOU DON'T NEED LIMING ANY MORE!



ASIDE from the mess and expense of baking, there are plenty of other reasons why the modern method of drawing without lime will pay dividends in your mill.

When you use a low alkalinity coating with suitable wetting out properties that will stretch out with the metal, you'll get proper cushioning and lubrication that will last through all the dies the wire passes through.

MAGNUS METAL COAT No. 267

has demonstrated in the past three and a half years that lime is no longer necessary in wire drawing. It can even be used to coat wire in process for shipment to another plant to be drawn in that plant without any further treatment and without any rusting. Magnus Metal Coat No. 267 offers these specific advantages:

1–Definitely better die life, particularly on high speed continuous machines.

2–More uniform and better finished wire.

3–An easy to clean, better wire for galvanizing, tinning, plating and any other finish.

4–Better bright, welding, tire bead and rope wire.

5–Better wire for wet drawing with lacquer, copper or zinc finish.

6–Improved protection against rust.

7–Material economy in amount of lubricant used.

8–Fewer rejects due to scratching.

9–No hydrogen embrittlement.

10–Cleaner machines and plant surroundings.

Ask for the complete story on Magnus Metal Coat No. 267 and the names of mills where it's been doing a superior job for a long time.

1921-1946 TWENTY-FIVE YEARS OF SERVICE TO INDUSTRY

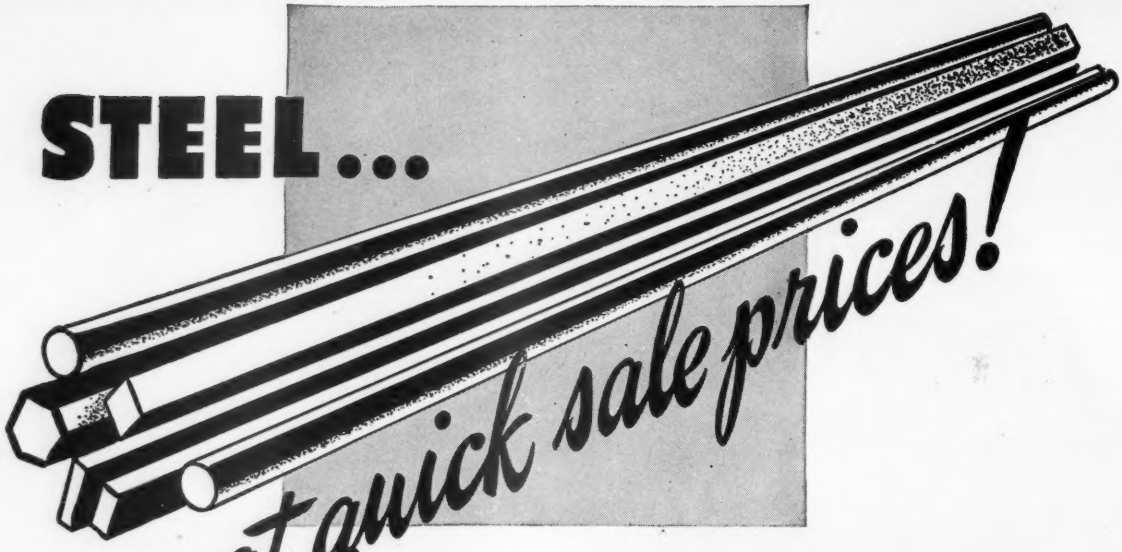
MAGNUS

MAGNUS CHEMICAL CO., 188 SOUTH AVE., GARWOOD, N. J.

Wire Drawing Compounds

GOVERNMENT-OWNED SURPLUS

STEEL...



at quick sale prices!

STEEL can be bought now through War Assets Administration, for immediate shipment to you. Alloy steel billets, blooms and many items of alloy steel bars, particularly in the larger sizes, are available in Chicago, Cleveland, Detroit and other Regional Offices.

Lowscale prices make it worth your while to buy this high-grade material, even if you intend it for low-cost products.

Carbon and alloy steel mechanical tubing is also available in a wide range of sizes and specifications. Contact your nearest War Assets Administration Office below, or clip and mail the coupon.

FREE INFORMATION

To War Assets Administration:*

Please send me full information, including availability and pricing of the following:

Carbon and Alloy Billets and Blooms ☐—H. R. & C. R. Alloy Sheets ☐—Strip and Plates ☐—Stainless Steel Sheet and Strip ☐—Mechanical Tubing, Carbon and Alloy ☐—Standard Type Valves and Fittings ☐

NAME.....TEL. NO.....

FIRM.....

ADDRESS.....

CITY.....STATE.....

*Send coupon to nearest Regional Office below for fast service.

All steel is subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

EXPORTERS

Most surplus property is available to the export market. Merchandise in short supply is withheld from export, and if such items appear in this advertisement they will be so identified by an asterisk.

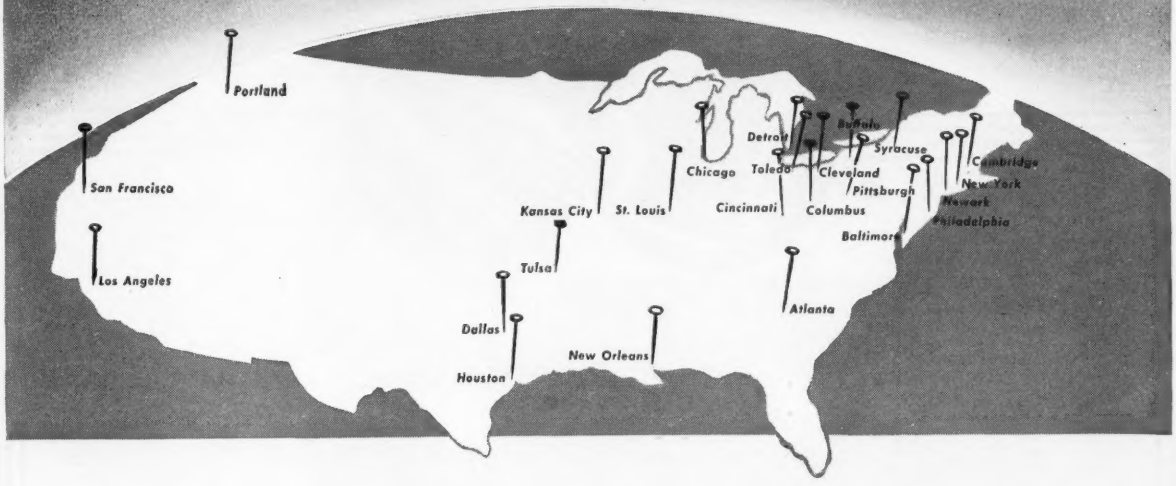
WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

157-6

Nationwide Distribution SPEEDS DELIVERY OF ALCOA ALUMINUM SCREW MACHINE STOCK



The big swing is to Alcoa Aluminum Screw Machine Stock. You can buy it in any quantity. Stocks are now the largest in history. With nationwide distribution, you get prompt shipment.

But that's not all—when you "turn it out of Alcoa Aluminum", you can cut your costs and increase your profit. Prices are less than prewar.

If you are not using aluminum for screw machine products, consider the advantages it offers you. Aluminum can be worked at top machine speeds. It gives a fine finish that is highly resistant to corrosion. It's light in weight.

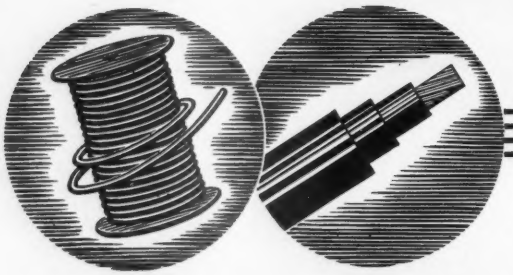
Hundreds of manufacturers are turning these advantages into profit right now. You can, too. Order your supply of Alcoa Aluminum Screw Machine Stock *today*. The nearby Alcoa office can give you prices.

ALUMINUM COMPANY OF AMERICA, 1828 Gulf Building, Pittsburgh 19, Pa. Offices in principal cities.

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM

SPECIALIZED RESEARCH EXPERIENCE



In All Types of Insulating Finishes and Impregnating Materials.

All Formulations made to individual specifications and to meet unusual requirements.

Our Hot-melt, Flame-resistant Compounds are non-toxic.

STANDARD VARNISH WORKS

Engineers of Product Finishes

NEW YORK - CHICAGO

SERVING INDUSTRY FOR 75 YEARS

VASCOLOY—RAMET

Tantalum / Tungsten

CARBIDE DIES

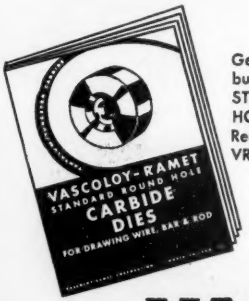
For

DRAWING WIRE BAR and ROD

NOTE TAPERED NIB AND CASING
Front and back openings in the new type casing permit easier inspection due to greater visibility.

- Easier to Work
- Greater Strength
- Time and Material Saver
- Better Lubrication
- Full Visibility

Maintain size longer and produce better finish. Tantalum/Tungsten Carbide has a lubricating characteristic which greatly reduces mechanical resistance in drawing, and in so doing, enables a much smoother finish. Many mills report longer productive life, less down time, greater tonnage per die and greater operator satisfaction. Write us for informative Bulletin VR348.



Get this helpful bulletin on STANDARD ROUND HOLE DIES. Request Bulletin VR348.

VASCOLOY Ramet RAMET CORPORATION

AN AFFILIATE OF FANSTEEL METALLURGICAL CORPORATION AND VANADIUM ALLOYS STEEL COMPANY

NORTH CHICAGO, ILLINOIS • SALES AND SERVICE IN PRINCIPAL CITIES

UNIQUE...

Each piece of Robertson Equipment is truly unique in that it is constructed particularly for the job required. In this way, all important specifications are known, all requirements are satisfied. Only in Robertson hydraulic equipment, too, do you get outstanding craftmanship endowed with skill and engineering knowledge garnered over many years. As the equipment preferred by many of the leaders in the manufacture of vulcanized rubber hose and rubber insulated wire and cable, Robertson equipment also, is in a unique position.

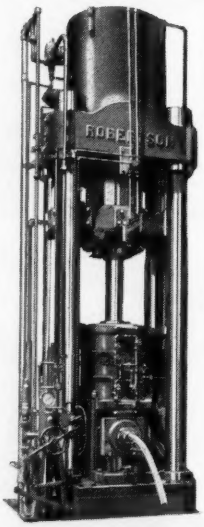
Robertson Equipment is used by Roebling, Phelps-Dodge, General Cable, General Electric, Crescent, Simplex, Northern Electric, National Electric Products Corp., Anaconda, Kerite, Paranite, Goodrich, and many others.

JOHN Robertson
COMPANY, INCORPORATED

125-135 WATER STREET, BROOKLYN 1, NEW YORK

Designers and Builders of all Types of Lead Encasing Machinery

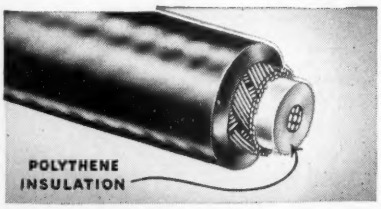
Since 1858



Cable Lead Encasing Press

THE VOICE COMES CLEARLY

. . . when the Microphone Cable is insulated with Du Pont POLYTHENE



Cross-section (4 times actual size) of microphone cable No. 1253-A made by Lenz Electric Manufacturing Co., 1751 North Western Ave., Chicago, Ill. Construction is as follows: Conductor stock—8 strands No. 36 AWG tinned copper, 2 strands No. 31 AWG phosphor bronze. 1/32-inch wall of polythene, applied to an O.D. of .082 inch. Shield of No. 36 AWG tinned copper, 4 ends. 1/32-inch wall outer jacket.

The chief function of the crystal microphone cable made by Lenz Electric Mfg. Co. is to carry the speaking voice over public address systems, in lecture halls, offices, factories. And the chief reason Lenz chose Du Pont Polythene for insulating this cable is this: *No matter whether the frequency is 60 cycles or 60 megacycles, the dielectric properties of polythene remain constant—bring the voice in clearly.*

This constancy of polythene is *one* of the reasons polythene is widely used in television, in radar, in high-frequency cable of many other kinds. Other advantages of polythene are:

- **Because of the high dielectric characteristics of polythene, only a minimum thickness is needed.**
- **The dielectric constant of polythene (2.2–2.3) and its power factor (less than 0.0005) remain almost constant in temperatures from −50°F. to 220°F.**
- **Polythene is chemically inert, and light in weight (specific gravity: 0.92).**
- **Polythene retains its toughness and flexibility at temperatures from −50°F. to 200°F.**

For complete data on polythene, write E. I. du Pont de Nemours & Co. (Inc.), Plastics Dept., Room 149, Arlington, N.J.

DU PONT
REG. U. S. PAT. OFF.
Plastics
BETTER THINGS FOR BETTER LIVING
THROUGH CHEMISTRY

Tubular Stranding Machines....

incorporate many profit building features

The Stranding Machine illustrated is a seven reel (in rotor) machine, accommodating 22inch, 500pound capacity reels. Stranding Machines of similar design are built to accommodate other reel sizes. Featured in this exclusive Syncro design are the following advantages.

1 Patented, simplified rotor construction and spider mounting.
2 Close grain, low friction metal wire guide shoes with large radius that eliminates troublesome sharp bends. This construction also eliminates the need for guide shoes.
3 Air off-spring set brakes provide rapid deceleration and quick stops.
4 Non-metallic, noise suppressing support rolls.
5 Anti-friction bearings throughout the entire machine.
6 Dynamically balanced rotor assures continued smooth running, vibration free operation.
7 Lay gear arrangement provides eight different pitch lays with one set of gears.
8 Quick acting, dependable safety reel locks.
9 Thirty inch diameter grooved capstans. Gear or variable speed drive as desired.
10 Rotor speed 500 RPM with 25 H. P. wound rotor motor.
11 Take-up unit friction driven from capstan, or independently motor operated as desired.

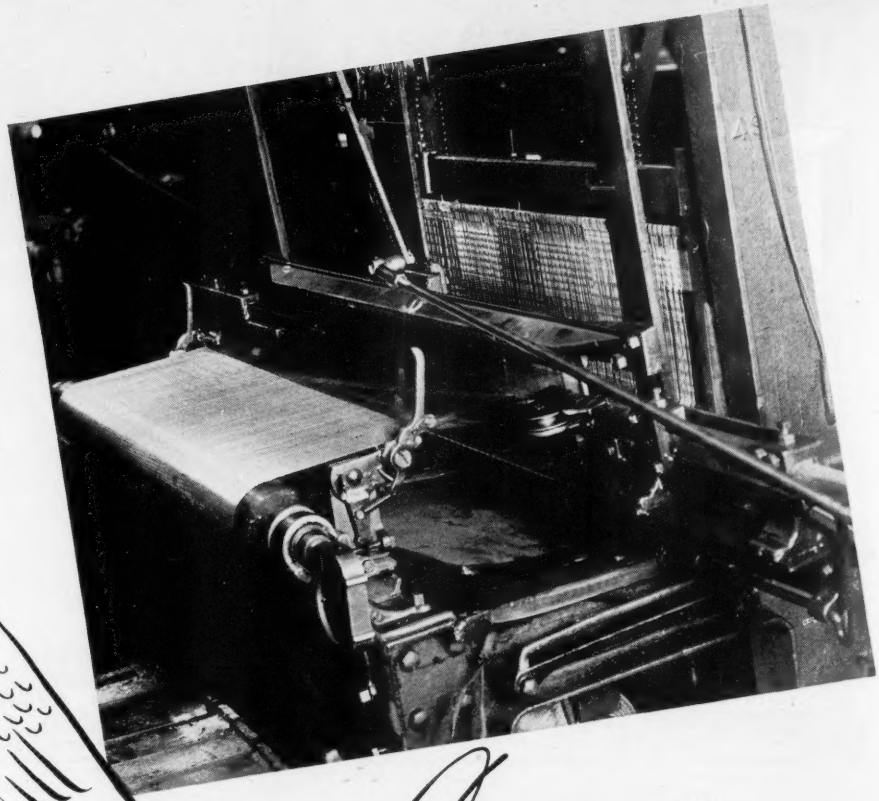
REPRESENTED IN CANADA BY
CANADIAN ELEVATOR EQUIPMENT CO.
TORONTO

SYNCRO MACHINE COMPANY

EXECUTIVE OFFICES AND GENERAL WORKS—611 SAYRE AVENUE, PERTH AMBOY, N. J.

Machinery for the Wire Industry

SYNCRO



Weaving industrial wire cloth

Reynolds Industrial WIRE CLOTH

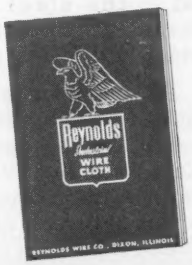
Controlled QUALITY...

Only the highest grade materials . . . fabricated by the most advanced processing techniques . . . with every production step under strict laboratory control—that's how quality is engineered into *Reynolds* industrial wire cloth, fine wire and weaving wire. Consult Reynolds weaving experts without obligation. Their more than fifty years of engineering *know how* is at your disposal.

Get this Buyers Guide

This new 32-page catalog, just compiled, is complete and easy to use. A request on your company's letterhead, or your card, brings you a copy postpaid.

FREE FOR THE ASKING!



REYNOLDS WIRE CO., DIXON, ILL., CHICAGO OFFICE: 332 So. Michigan Ave.

B
A C
OF SCRAP and THAT STEEL YOU WANT
IN THE OPEN HEARTH FURNACE, A TON OF SCRAP
CAN REPLACE A TON OF HOT PIG IRON... AND
HERE'S WHAT IT TAKES TO PRODUCE PIG IRON
IRON ORE
IRON ORE
COAL
LIME-
STONE
HOURS OF BLAST FURNACE TIME
HOURS OF BLAST FURNACE LABOR

To you "scrap" may be just worn-out machinery, broken pipe and such junk---worth nothing to your business.

But it IS worth a lot to your business delivered to the steel producer. Scrap may be the means of supplying you with more of the new steel and steel products you want.

As every buyer knows, steel is produced by "blending" hot pig iron and scrap in the open hearth furnace. Each ton of available scrap can replace a ton of pig iron. The greater the shortage of scrap, the heavier the drain on pig iron supply to produce a given tonnage of steel.

But every extra ton of pig iron produced calls for the use of approximately two extra tons of iron ore, one extra ton of coal and one extra half-ton of limestone, processed in a blast furnace, involving many extra hours of time and labor. It is obvious that there is a limit to America's blast furnace capacity. So the quickest, most effective way to produce maximum steel tonnage now is to find and use more scrap.

Help yourself to more steel by starting more scrap into the channels that serve the mills.

QUALITY YOUNGSTOWN SERVICE

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

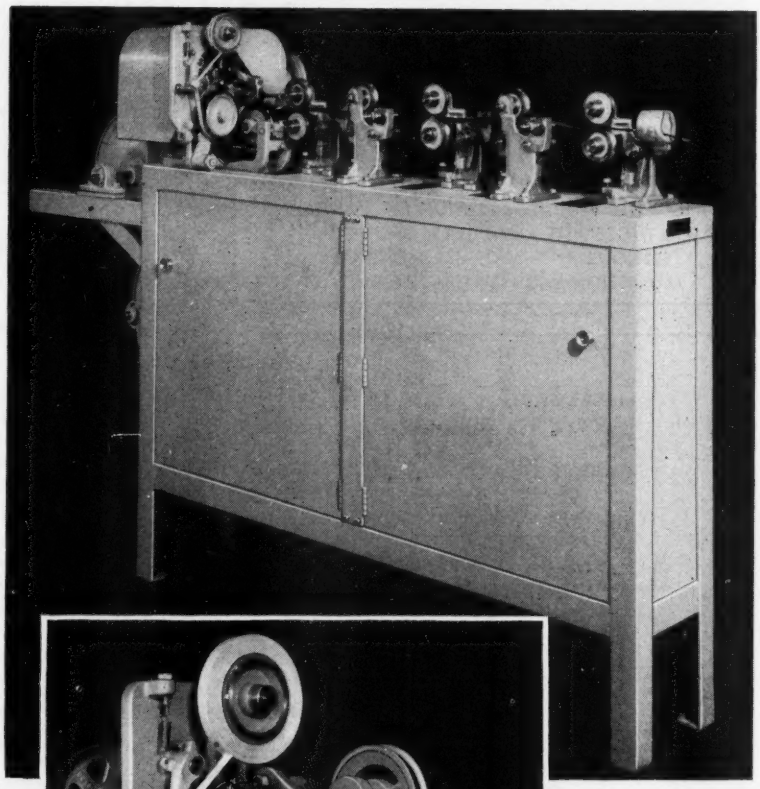
CARBON - ALLOY AND YOLOY STEELS

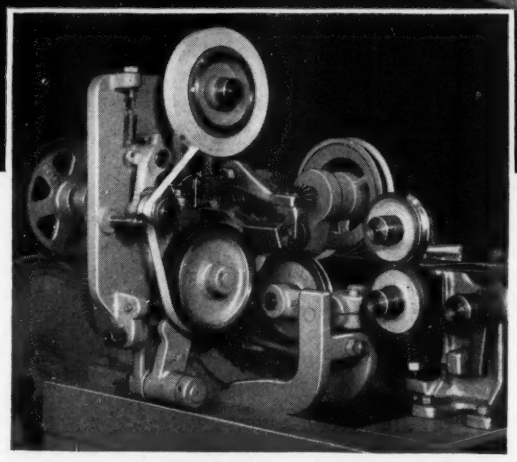
Pipe and Tubular Products - Sheets - Plates - Conduit - Bars - Electrolytic Tin Plate - Coke Tin Plate - Rods - Wire - Cold Drawn Carbon Steel Rounds - Tie Plates and Spikes.

WIRE LABELLING MACHINE
TYPE A

FOR APPLYING THE NEW UNDERWRITERS' PS* LABELS TO WIRE AND CORDS . . .

May also be used to apply PS* circuit-designation, customer's name, trademark or any other label.





OUTSTANDING FEATURES:

SPEED

The new J.L.E. Wire Labelling Machine will apply Underwriters' PS* labels to wire and cords at speeds IN EXCESS of 1000 F.P.M., spacing the labels five feet apart.

OPERATION

Operated by the pull of the wire through the machine, the labelling operation is not necessarily a separate one, but can be combined with any other reeling or insulating operation.

OTHER FEATURES:

1. No chance of damage to the wire by the machine or the label.
2. Labels can be applied before wire is cut and stripped for cord sets, since labels do not affect stripping and cutting blades.
3. No danger of cutting hands of operators or customers on sharp edges, since labels have no metal parts.
4. No danger of labels disintegrating because of defective glue.
5. Labels applied by J.L.E. machine give cords and cord sets a far neater appearance.

A complete proposal covering the J.L.E. Labelling Machine for the application of the Underwriters' PS* labels will be gladly submitted on request. Ask for your copy NOW!

*Pressure-Sensitive Labels

JAMES L. ENTWISTLE CO.

43 CHURCH STREET, PAWTUCKET, RHODE ISLAND

World's Leading Manufacturer of Spark-Testing Equipment

Chicago Office: Room 447, Monadnock Bldg., 53 West Jackson Blvd., Chicago, Illinois. British Associates: General Engineering Co., Ltd., Bury Road, Radcliffe, Lancs., England. Canadian Representative: The A. R. Williams Machinery Company, Limited, Toronto, Ontario.

TENTATIVE PROGRAM

The Wire Association Annual Convention

Hotel Statler, Buffalo, N. Y. — October 21-24, 1946

MONDAY, OCTOBER 21

Morning Events

Registration

Directors' Meeting — 10:30 A. M.

Program Committee
Meeting and Lunch — 12:30 P. M.

THERE WLL BE A REGISTRATION FEE OF $5.00
FOR THOSE ATTENDING THESE TECHNICAL
SESSIONS AND INFORMAL MEETINGS
ADMISSION WILL BE BY BADGE ONLY

Afternoon Session — 2:00 P. M.

Present Day Labor Problems

by John L. Sanderson, Asst. Supt. Wire Mills
Keystone Steel & Wire Co.,
Peoria, Ill.

The Effect of Water Impurities
in Electro-Plating

by F. R. Morral, Metallurgist,
American Cyanamid Company,
Stamford, Conn.

TUESDAY, OCTOBER 22

Morning Session — 10:00 A. M.

Wire Rod Production

by Ralph D. Hindson
The Steel Co., of Canada, Ltd.,
Hamilton, Canada

Some Unusual Conditions
Encountered in Cold Heading Products

by F. W. Nobbs, Chief Inspector
The Steel Co. of Canada, Ltd.,
Toronto, Canada

Afternoon Session — 1:30 P. M.

Mill Practice — The Care and Maintenance of Dies

by R. R. Preston, Engineer
The Carboloy Co., Inc.,
Pittsburgh, Pa.

Possible Applications of the Cyclograph
Principle to the Inspection of Wire, Wire Rope
and Kindred Materials

by Dr. O. W. Ellis, Director,
Dept. of Engineering and Metallurgy,
Ontario Research Foundation,
Toronto, Canada

WEDNESDAY, OCTOBER 23

Morning Session — 10:00 A. M.

Preparation of Metallographic Specimens

by Freeman Anderson, Chief Metallurgist,
National Lock Co.,
Rockford, Ill.

Applications of Tin as a Coating Material

by Dr. Bruce W. Gonser
Battelle Memorial Institute
Columbus, Ohio

Afternoon Session — 1:00 P. M.

WIRE ASSOCIATION LUNCHEON
THE MORDICA MEMORIAL LECTURE

To Be Presented By
Fred M. Crapo, President,
Indiana Steel & Wire Company
Muncie, Ind.

— MOTION PICTURES —

— 4:30 P. M. —
Wire Association Annual Meeting

— 7:30 P. M. —
ANNUAL DINNER — STAG SMOKER

THURSDAY, OCTOBER 24

Morning Session — 10:00 A. M.

Aluminum Wire Fabrication

by H. S. Spaulding
Aluminum Company of America

Some Observations on Manufacturing Insulated Wire
in Wartime Germany and The United States

by R. A. Schatzel, Vice President and
Director of Engineering
Rome Cable Corporation,
Rome, N. Y.

Afternoon Session — 1:30 P. M.

Synthetic Insulants in the Cable Industry

by D. Short, Electrical Engineer
Canada Wire & Cable Co., Ltd.,
Toronto, Canada

Applications of Fiberglas to Wire and Cable

by Fred F. Sampson, Jr.,
In Charge of Wire and Cable Section,
Insulated Wire Division
Owens-Corning Fiberglas Corp.,
Toledo, Ohio

ADDITIONAL information may be obtained from

300 MAIN STREET **RICHARD E. BROWN, SECRETARY, THE WIRE ASSOCIATION** STAMFORD, CONNECTICUT

The Wire Outlook

Economists and psuedo-economists are doing much talking and writing on the subject of inflation and its corrolary, an equal-and-opposite reaction — deflation. Cycles are cited, charts are made and the inevitable conclusion preached that what goes up must come down.

Little is said about rising prices and the public debt. The Keynes philosophy of spending still reigns in the White House environs and we venture the thought that the inflationary trend cannot be stopped while spending exceeds income. It is more likely to continue, first, until the Federal budget is balanced and, second, on to a point where the national debt and the national income bear some semblance of a reasonable relationship to one another.

The economics of this is simple. The national debt is too huge to be paid off unless taxes are greatly increased, in which event the tax burden would curtail our purchasing power, lower our standards of living and destroy our much needed markets for goods at home.

Every step of the way price advances will be fought by business, industry, the labor fraternities and the public. This is highly desirable, insofar as it prevents run-away inflationary trends, but it will involve continuous headaches. Old Man Economic Law cannot be legislated out of existence and is inexorable in his operation. The years of casual, care-free and even wanton extravagance of Washington, in which billions and billions of dollars were strewn about the world with no bearing on our war-winning necessities, have laid a basis for an inflationary adjustment that no hand can stop. The travails that will accompany this adjustment can be mitigated to no small degree by the elimination of every unneeded bureau, by dropping a couple of million Federal employees from the payrolls, by stopping Federal hand-outs to foreign nations and getting back to a relatively simple bed-rock plan of government in which the outgo is no greater than a minimum of necessary income. Whether the present Administration, which bought its way into power with your money and mine, will ever achieve this salutory state is highly doubtful.

Therefore, do not be alarmed unduly when the next wave of wage and price increases strike us and if you find in 1950 that a car, costing $1000 in 1940 costs you $3000 — your income at that time will be in proportion to the car's price.

After a suitable level of balance is attained, then the cycle theory may again operate. At that time, depending on the intelligence with which we have set our house in order, the rise and fall of business indices will be severe or moderate, depending on the degree of correction required to bring us into adjustment with basic conditions.

Our great need is for level heads in the upward spiral, during which time goods must be produced to capacity if we are to maintain economic integrity. It goes without saying that the savings of the nation, as represented by the Federal debt, will be depreciated in purchasing power.

No offsetting depression is necessary. No depression has to bring us back to the pre-war price-wage levels, no depression can reduce us to old price levels unless in some miraculous way the national debt were to be wiped out. The debt is our guide to the future; keep your eye on it and on Washington's efforts to stop the drain on our national economy. This inflation we are in is not one resulting from over-expansion, from easy credit, from over-optimism, but is our adjustment to a debt that cannot be paid. At least, that's the way we see it!

—from the Editor's Desk

Morgan-Connor Wire Machines

Designed to make your payroll more productive . . . to make a fair return on your investment . . . to make your competitive position — and the jobs of your employees — more secure.

Built to operate faster and more efficiently . . . to reduce power costs . . . die costs . . . maintenance costs . . . space requirements.

Backed by a pioneer builder with experience gained from many years of contacts with practical mill men.

Let us work with you.

WM 6

MORGAN WORCESTER

MORGAN CONSTRUCTION COMPANY

WORCESTER, MASSACHUSETTS

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 21 SEPTEMBER, 1946 No. 9

Designated as
Official Publication By The Wire Association

Contents

Editorial Page 661

Shot Peening and Its Importance in the Spring Industry
By L. J. Weischhaus 665

A Correlation of Tensile Strength and Drafting of Soft Steel Wire ..... By Maurice M. Karnowsky 669

A Review of Inhibitors, Part III — Bibliography
By Wallace G. Imhoff 673

Corkscrews 675

Wire Drawing Machines — Past, Present and Future
By N. Davidson 676

Government Wire Production Information 680

Outstanding Personalities of the Wire Industry 684

A Review of Recent Wire Patents 688

Index to Advertisers 704

Where-to-Buy 705-708

— ASSOCIATE EDITORS —

Kenneth B. Lewis, Consulting Wire Mill Engineer
Com. W. Spowers, Jr., U.S.N.R., Consultant on Galvanizing
Lancaster, Allwine & Rommel, Consultants on Patent Information

Richard E. Brown, General Manager
R. S. Spengel, Business Manager
E. D. Sickels, Advertising Manager

Publication Office: New York, N. Y.
Executive Office: Stamford Trust Co. Bldg., 300 Main St., Stamford, Conn.

Annual Subscription, U. S. $5.00, Canada $5.00

50 Cents a Copy in U. S. Issued Monthly Foreign, $7.50

October Convention Issue $1.00 a Copy
January Convention Discussions Issue $1.00 a Copy

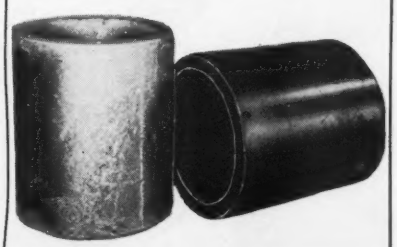
Copyright 1946, Quinn-Brown Publishing Corp. WIRE AND WIRE PRODUCTS is fully protected by copyright and nothing that appears in it may be reprinted wholly or in part without permission.

USE
"STEVENS"
FLANGED STEEL
TRAVERSES

for
WIRE and CABLE
if you want
Rugged Construction
Low Assembly Costs
Ease of Handling

MANUFACTURED UNDER
license arrangements with
WESTERN ELECTRIC
COMPANY, INC.

Traverses are furnished to your specifications as to size, number of holes for bolt and drain holes and finish. Standard finishes are: plain, painted or hot-dip galvanized. Sizes up to 56″ in diameter and 56″ in traverse.



STEVENS Traverses can be used over and over. Some have given as much as sixteen years' service.

NUMBER of trips per reel increased 50% to 100% before cut-downs or scraping wooden reel heads.

THE STEVENS METAL PRODUCTS CO.,
NILES, OHIO

- Improved round die design for wire, bar and tubing
- Improved forged steel casings for greater strength and tighter grip on nibs
- Improved carbides for longer die life and increased production
- Immediate deliveries; practically all sizes of round dies now available from stock

Call **Firth-Sterling STEEL COMPANY**

McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 21 SEPTEMBER, 1946 No. 9

Shot Peening and its Importance in the Spring Industry

By L. J. Wieschhaus, Market Research Engineer
American Foundry Equipment Company,
Mishawaka, Ind.

The advantages of "Shot Peening" as compared to "Shot Blasting" and the methods pursued are described in this paper.

INTEREST in shot peening and its applications has grown rapidly in the last two decades until today it is in general use as a means of improving fatigue life of frequently stressed parts.

* * *

IT might be well to define the term **"Shot Peening."** As used in this paper, **"Shot Peening"** will refer to the blasting of a surface with a metallic shot for the purpose of improving its fatigue properties, as compared with "shot blasting" which will be used to mean the blasting of a surface with shot or grit for the purpose of removing scale, rust or sand.

Peening Effects

THE effects of Shot Peening are all limited to a very thin surface layer of the metal. The peened surface has a pebbled appearance; and if a cross section is viewed under a microscope, the crystal structure close to the surface will appear much finer than that of the rest of the metal.

* * *

THE tensile and compressive properties of a peened specimen will be very little different from that of an unpeened specimen. The great difference in physical characteristics that peening brings about in a metal, is it's increase in fatigue resistance. All research men agree that peening, if properly done, will increase the fatigue strength of a metal appreciably.

* * *

THE question arises: **"What is the explanation of this increase in fatigue strength if none of our ordinary testing methods show any change in the physical properties of the metal?"** There are several possible explanations for the failure of a metal in fatigue. (It should be noted that the surface layers of repeatedly stressed specimens are much more subject to failure than the inner areas). One is that the unsupported surface crystals tend to fail through fatigue much more easily than their closely supported brothers within the metal. Another reason is that microscopic pits and scratches on the surface act as stress raisers and are points of incipient failure. Another explanation is that tensile stresses have been set up along the surface layers of the metal as a result of machining or heat treating the specimen. These stresses, combined with applied stresses, become great enough to cause failure. Since fatigue failures almost invariably start as a result of tension stresses, this third explanation is probably the most important. It is very likely that the true cause of fatigue failure is a combination of all three of these theories.

* * *

WHILE Shot Peening might not correct these conditions it does alleviate them to a great extent by (1) creating a much finer crystal structure at the surface, (2) lowering stress concentration at any one notch or pit by the presence of other notches or pits nearby, (3) setting up a compressive stress in the surface layers of the metal.

* * *

THE fact that this compressive stress exists has been shown by many tests. In fact, a test gauge has been developed by **J. O. Almen** based on the effect of this compressive stress. Since failures are caused principally by tensile stresses on the surface of the metal, it will be seen that prestressing the surface in compression will result in much lower **net** operating tension stresses.

Methods

MANY types of equipment have been developed that will per-

form this peening action. A simple peen hammer might be used; driven either by air or by hand. Another way of doing this is by air-blast. Small round shot can be blown at the surface of the metal by the use of a strong blast of compressed air. Another, and the newest and most efficient way of performing this work, is by the use of airless blast equipment.

* * *

AN essential part of airless blast equipment is a bladed wheel which hurls the shot at the surface to be peened. The shot acquires a high velocity as a result of a combination of tangential and centrifugal forces. This blast wheel or **"Wheelabrator"** is incorporated in a standard line of machines for tumbling or rotating the work in the blast.

* * *

ONE of the advantages of the airless blast method over the airblast is the increased efficiency as demonstrated by the fact that one 19½" Wheelabrator will throw 300 pounds of abrasive per minute at a cost of 15 H. P. while 5⅜" nozzles are required to throw the same quantity of abrasive at 80 psi pressure and at a cost of **190 H. P.**! The Wheelabrator also provides more uniform shot coverage.

Tests on Springs

THE **Wallace Barnes Co.**, who were one of the early spring manufacturers to use shot peening, experienced considerable difficulty in getting metallurgists to accept springs which had received this treatment. These springs were accepted only after actual engine tests proved conclusively that shot peened springs were far superior to springs with the conventional smooth finish.

* * *

THE research division of **General Motor Corporation** has run tests on a great many different types of products to determine the effects of shot peening on fatigue life. Helical springs, for example, showed a life improvement of 1370 percent. This is in line with the results of research by other investigators.

* * *

IN 1940 **Mr. Zimmerli** reported results of tests on springs. These results are shown in Table 1.

TABLE I

Material of Spring	Normal Stress Range lbs./sq. in.	Shot Blasted lbs./sq. in. Stress Range
Valve spring wire	20,000 to 95,000	20,000 to 135,000
Music wire S.A.E. 1095	20,000 to 90,000	20,000 to 135,000
Electric furnace	20,000 to 90,000	20,000 to 135,000
18-8 Stainless	20,000 to 65,000	20,000 to 110,000
13-2 Stainless	20,000 to 80,000	20,000 to 120,000
Phos. Bronze S.A.E. 81	20,000 to 35,000	20,000 to 50,000

HE observes that while peening improves the endurance of some specimens that have scratches which are round at the bottom, the process is not a cure for either defective steel or defective manufacturing methods.

* * *

H. H. CLARK reports results of tests on 33 peened and 33 unpeened springs made of ASTM 230-41 carbon valve spring wire of 0.162 inches diameter with the results shown in Table II.

TABLE II

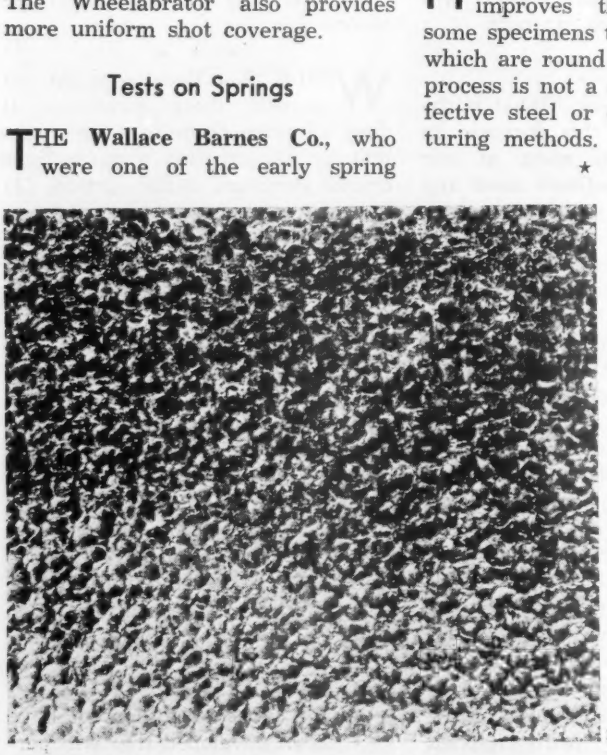
Cycles	Shot Blasted	Not treated
Minimum	400,000	40,000
Maximum	5,000,000	200,000
Average	2,000,000	50,000

* * *

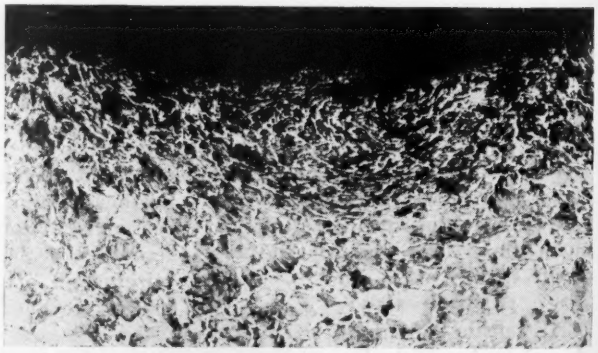
A POINT of interest in connection with this table is the great spread in fatigue life. This is in line with the results obtained by numerous other investigators who found that the scatter obtained in fatigue tests results increases as the test stress approaches the endurance limit. This condition is possibly due to unequal peening intensities on different specimens.

Effect on Design

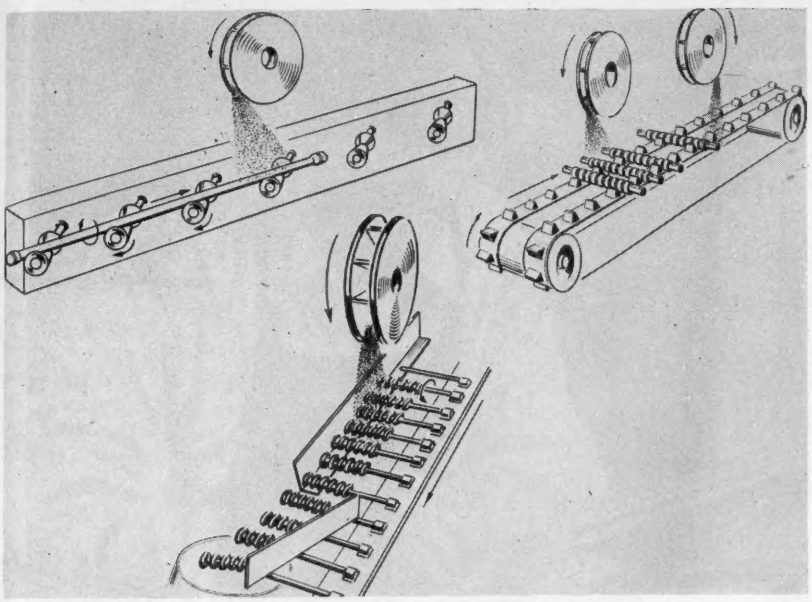
WHAT effect this greatly increased life due to shot peening will have upon the design of springs is very difficult to state. It can result, of course, in simply a greatly increased spring life if the



CROSS SECTION VIEW



Cross section view (200X) and surface view (X) of short peened steel. The cross section view shows the fine crystal structure that results from shot peening. Surface view shows the pebbled appearance that is so characteristic of shot peened metal. * * * *



These are line drawings of various types of Wheelabrator installations for shot peening work of different shapes and designs. The lower illustration shows the set-up for shot peening valve springs. The work is mounted on steel bar fingers fitted to an endless rubber conveyor belt. The springs are held on the fingers as they pass through the blast zone. The drawing in the upper left hand corner shows the method of shot peening torsion bars. The work is rotated and carried through the blast by a series of skewed rollers. The drawings in the upper right shows method of peening tank tread pins.

manufacturers continue to use the same design factors that they have used in the past. In the case of the aircraft industries, for example, the fatigue life of the springs might be kept at approximately their present standard with a resultant decrease in the size or weight of the spring. Another way advantage can be taken of this peening process is, for example, in the case of the automotive industry where springs can be made lighter and more flexible, thereby giving better riding properties to the automobile without any increased mortality of springs. This choice of design will depend upon the individual engineer concerned as well as upon various economic factors in each individual industry. The advantage, however, is there to be used as the individual sees fit. It must be kept in mind that each shot peening application requires its own research program in order to determine the exact improvement gained.

* * *

PRACTICALLY any type of spring can be and has been peened by the airless blast method. Coil springs of all sizes and shapes as well as leaf springs of every size from a fraction of a pound up to 30 or 40 pounds per leaf have been satisfactorily peened in specially built cabinets or on standard machines. The increase in use of torsion bars in recent years has provided another field where wheelappeening has had marked success.

* * *

THERE are certain factors which affect the advantages obtained from peening springs.

1. The advantages of peening increases with the number of flexures that a spring must undergo during its normal lifetime. In other words, very little advantage is obtained from peening springs which will be flexed less than 100 or 200 times during their normal life. The great advantage to be obtained in peening is in cases where springs are designed for a normal life of 100,000 flexures or more.

2. It is apparently true that the greater the thickness of the material being peened the deeper the peening must go in order to obtain any appreciable effects. This increase in depth of peening can be obtained either through the use of larger shot or the use of higher shot velocity.

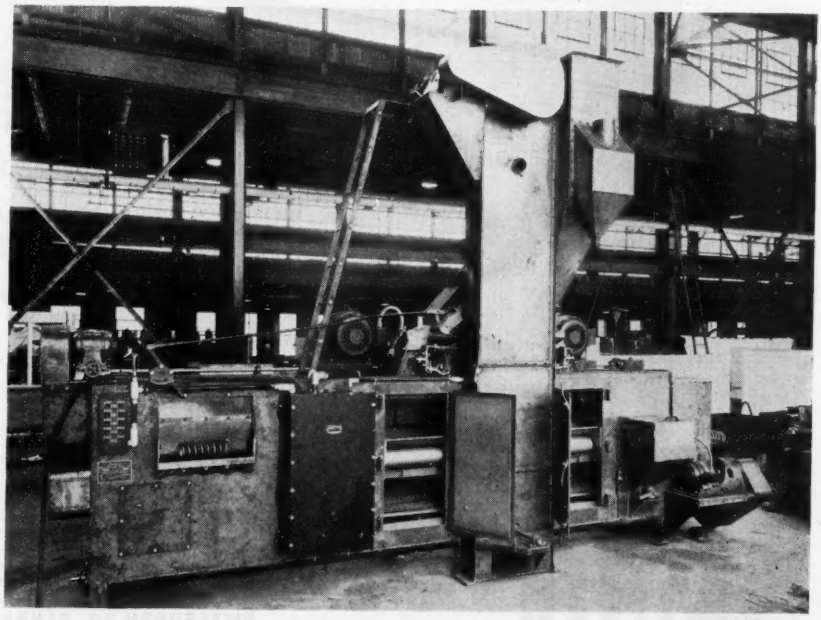
* * *

WHILE practically any kind of shot blast equipment can be used with reasonably good results for shot peening springs, there are certain machines which are best adapted for each type of material to be peened and considerably better results will be obtained by using the proper equipment.

* * *

THE best types of equipment and the ones in most general use, are special cabinets designed for a particular job. A few of these are shown in the accompanying photographs, both for coil springs and for leaf springs. These machines can be designed to handle any production capacity that is necessary to meet the requirements of a particular plant. They also have the

(*Please turn to page* 701)



This is a special cabinet for peening coil springs. Springs enter at the left and are carried by means of a conveyor through the shot blast coming out fully peened at the right. The Wheelabrator unit is shown in the center of the machine rigth next to the shot elevator.

Precisionbilt LIKE A FINE GUN

J&L WIRE ROPE

PERMASET PRE-FORMED

J&L Wire Rope is made with precision by skilled men with the same patient attention to detail, the same insistence upon quality material, as the best hand-made match piece.

J&L Permaset Wire Rope is pre-formed to give it longer life. It hits the target on service. Write for more information.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

A Correlation of Tensile Strength and Drafting for Soft Steel Wire

By Maurice M. Karnowsky, Ass't. Chief Metallurgist
Wire Division, Continental Steel Corporation
Kokomo, Ind.

ONE type of question that every wire metallurgical department has to answer is, "What is the tensile strength of 16 ga. wire?" Or, "At what gage shall we process to obtain a tensile of 100,000 psi on 19 ga. wire?"

* * *

A GOOD way to find the answer to this type of question would be to refer to records of previously tested samples; however, an extremely large number of tests would be necessary, to compile such a record in order to include every conceivable processing practice and size within the capacity of the mill, if the results were to be of practical value.

* * *

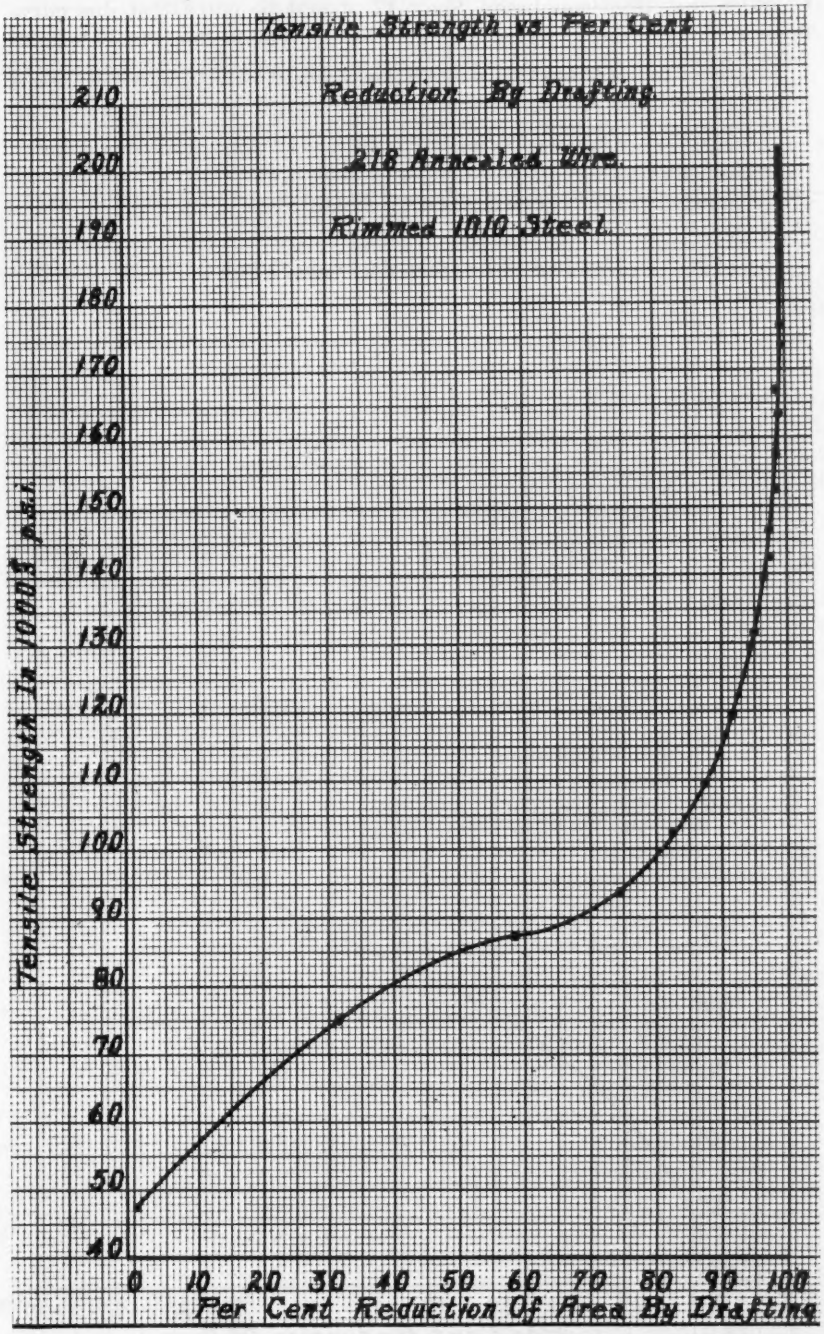
THE purpose of this article is to present a simple, rapid and relatively accurate method of predicting the tensile strengths of straight drawn and processed low carbon steel wires. The limiting qualifications are: hot rolled or annealed initial conditions, known ranges of chemical analysis, and whether rimmed or semi-killed steel is involved.

* * *

IT has been found that the results of tensile tests on wire stripped from each block of a multiple block machine fall in a definite pattern when plotted against percentage reduction of area when drafting from the rod. When such a curve has been established, the tensile strength for any size wire of similar range of analysis straight drawn from any size rod, can be predicted, provided only that the percentage reduction by drafting is known.

* * *

CURVE I illustrates the type of pattern obtained for S.A.E. 1010 rimmed steel. A 0.218" an-



CURVE I

nealed wire was drawn six drafts on a Vaughn 5/6 HR machine to 16 ga. (0.0625″). The bundle of 16 ga. wire was then drawn, single draft at a time to 0.0103″, the size of the smallest die then available; tensiles were run after each draft and Curve I drawn with tensile strength plotted against reduction of area.

* * *

FOLLOWING are the data on which the curve was based. See Table A.

CURVE I seems to indicate that the increase in tensile strength follows drafting in an orderly fashion; the initial draft drastically increasing the tensile, with successive drafts furnishing smaller increments until a reduction of about 80% is reached, where a very rapid increase in tensile follows a small increment of reduction.

* * *

IT should be noted that this curve differs only in the first 30 percent of reduction from that published by **Bonzel**; beyond 30% his curve and this one are almost identical.*

* * *

USE of this curve in predicting tensiles showed results consistently low by about 10,000 psi., for which a number of factors to be enumerated later could be responsible. In order to arrive at a curve more nearly representative of mill drawing practice, another was plotted from data obtained from drawing hot rolled rod instead of an annealed wire of similar size. Beyond 16 ga. the curve was extrapolated in the same pattern as the strength increase of the wire drawn from .218″ annealed stock. The result of plotting these tests is shown as Curve II, data for which follows. (See Table B).

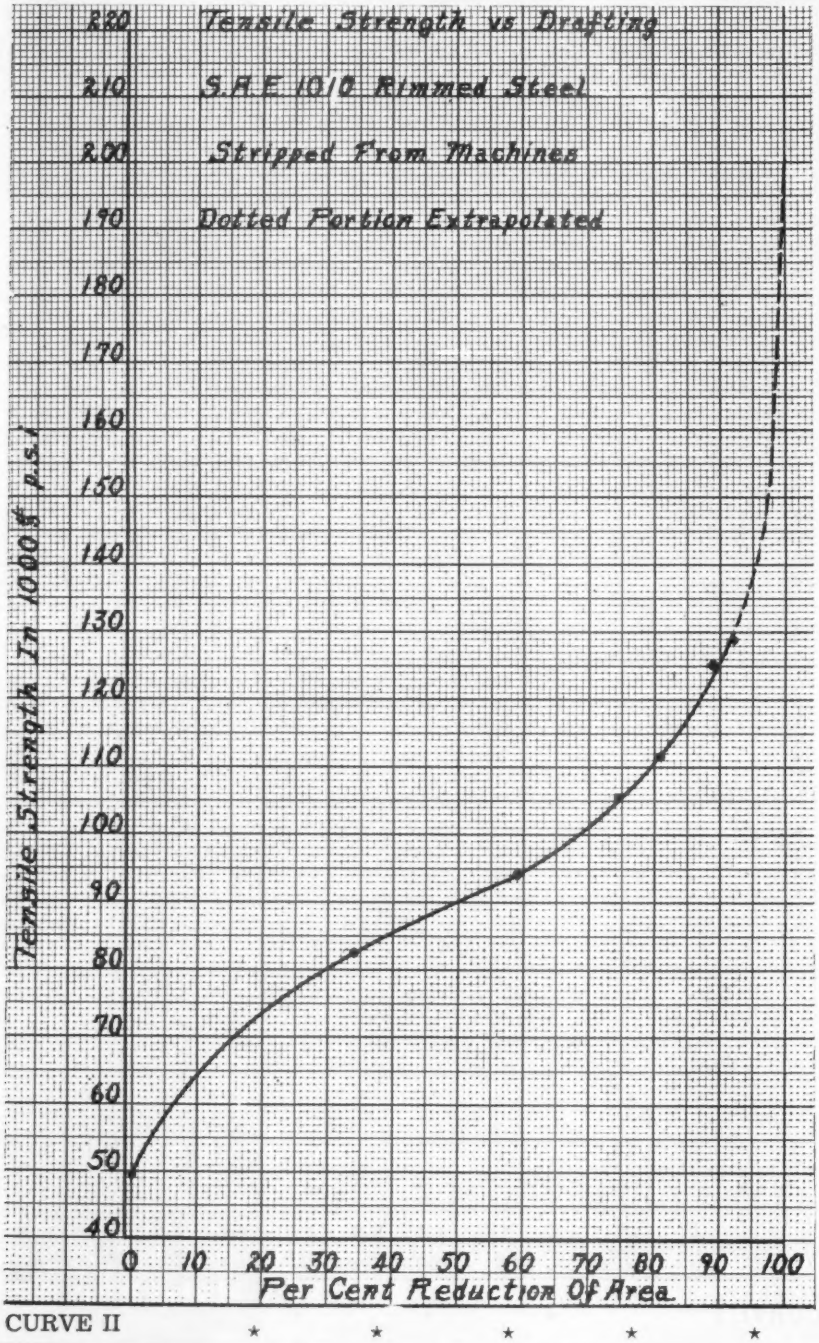
TABLE A

Dia. Inches	Tensile Strength Pounds Per Square Inch	Reduction of Area By Drafting. Percent
.218	47,800 psi.	0.
.180	75,400 ″	31.8
.140	87,200 „	58.5
.110	93,800 „	74.3
.092	102,500 „	82.2
.076	109,200 „	87.9
.063	119,800 „	91.7
.0528	129,500 „	94.2
.0488	131,300 „	95.0
.0425	139,200 „	96.2
.0385	142,300 „	96.9
.035	146,500 „	97.4
.0315	152,000 „	97.9
.0281	158,000 „	98.3
.025	167,000 „	98.7
.0228	163,000 „	98.9
.0198	173,500 „	99.2
.018	176,600 „	99.3
.0156	188,000 „	99.5
.0138	195,200 „	99.6
.0128	198,700 „	99.66
.0213	200,800 „	99.68
.0115	201,000 „	99.72
.0103	203,000 „	99.8

IN order to demonstrate the use of Curve II several random samples were selected and tested from current wire mill production.

* * *

SAMPLE A was straight drawn .218″ wire from a 1 ga. (.283″)



CURVE II

*Bonzel, Maurice. Steel Wire Manufacture and Properties. Translated by Kenneth B. Lewis, page 204.

hot rolled rod. Since Curves I and II were developed on data from wire or rod of approx. No. 5 ga., the inclusion of this sample illustrates effects of drafting from a larger rod. Reduction of area

$$= 100 - \frac{(.218)^2 \times 4}{(.283)^2 \times 4} = 40.7\%$$

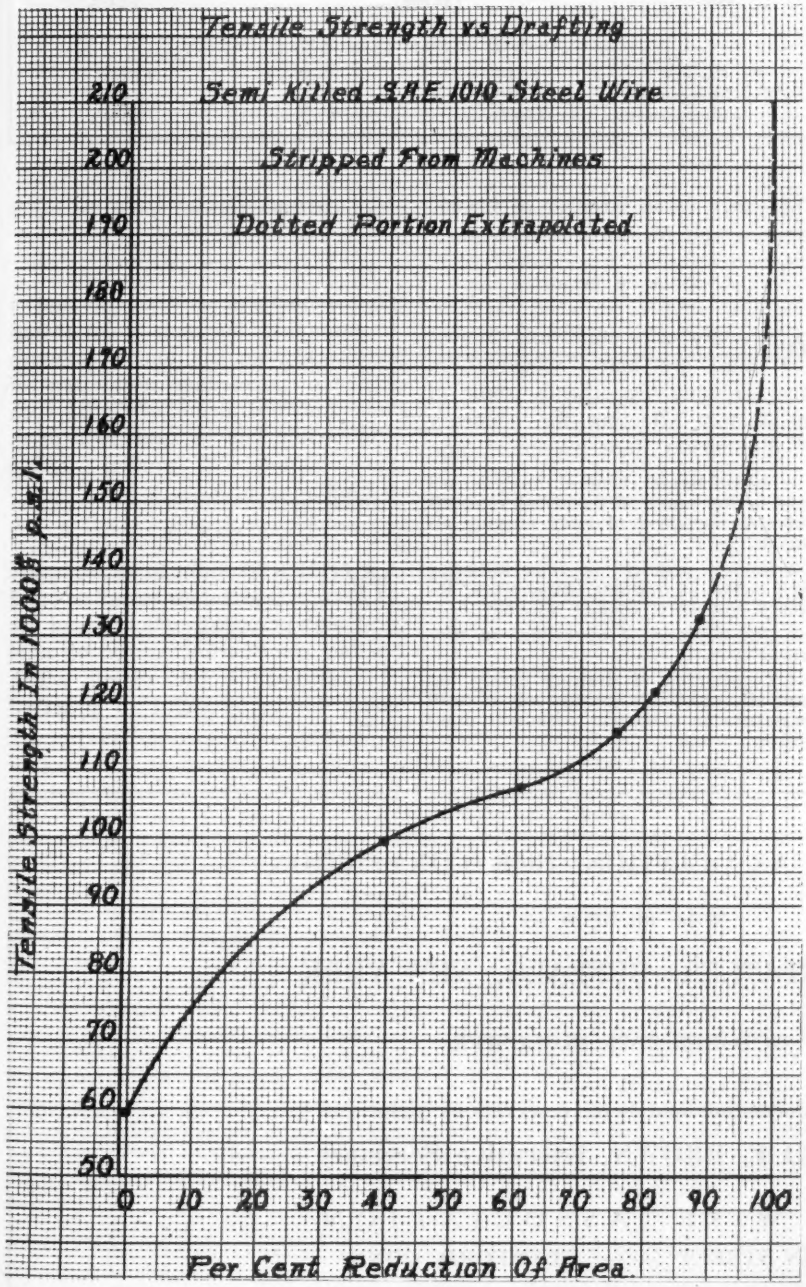
The Curve, for this reduction, shows a tensile of 85,700 psi.; the actual tensile was 86,800 psi.

* * *

SAMPLE B was a 7 ga. (.177″) wire drawn from a 4 ga. (.224″) rod. Reduction of area = 28.0%. The predicted tensile was 79,000 psi.; actually the tensile was 81,700 psi.

* * *

SAMPLE C was included to verify the extrapolated portion of the Curve. On 18 ga. (0.0475″) wire straight drawn from No. 5 rod requiring about 95.2% reduction a tensile strength of about 140,000 psi. was indicated; 141,100 psi. was the actual obtained.



CURVE III

TABLE B

Physical properties of 16 ga. 1010 steel wire drawn in 6 drafts from No. 5 rod, on Vaughn 5/6 HR machine

Dia. Inches	Tensile Pounds per square inch	Percent Reduction of Area by drafting
.220	49,700 psi.	0
.179	82,800 „	33.9%
.141	94,800 „	59.0%
.111	105,900 „	74.6%
.096	111,900 „	81.0%
.076	125,000 „	89.1%
.063	129,300 ”	91.8%

Analysis of Steel (Rimmed)

Carbon	0.09%
Manganese	0.38%
Phosphorous	0.008%
Sulfur	0.040%
Copper	0.22%

* * *

IT was reasoned that since wire from annealed and hot rolled rod stock followed a very similar pattern, processed wire tensiles could also be predicted.

* * *

SAMPLE D illustrates the use of the curve for obtaining tensiles on wire drawn from process annealed stock. An 18 ga. wire processed from 13 ga. shows a reduction of area as follows:

Reduction of area

$$= 100 - \frac{(0.048)^2 \times 4}{(0.091)^2 \times 4} = 72.2\%$$

The use of the A & B with the C & D scales on the slide rule simplifies this calculation with a 72.2% reduction. The curve would indicate a 103,000 psi. Tensile against an actual, which was 104,300 psi.

* * *

IN similar fashion the curve can be used to determine the size of annealed wire for obtaining a given tensile through processing. For example, suppose a 19 ga. wire of rimmed 1010 grade steel is desired, with a tensile of 100,000 psi. The

curve shows that 100,000 psi. is obtained at 68.0% reduction of area. From the slide rule one can readily ascertain the size for which to process is .0725″ or 15 ga. An actual sample of 19 ga. drawn from 15 ga. annealed showed a tensile of 97,000 psi.

* * *

THE entire foregoing discussion concerned 1010 rimmed steel and it was felt that a similar relationship should exist for semi-killed steel. Curve III is a plot of the increase in tensile strength to be expected from drawing such a semi-killed steel. The samples were obtained in the same way as for Curve II, having been taken after each draft on a multiple-block machine. Curve III was constructed on the following experimental data. (See Table C):

* * *

SEVERAL samples were collected at random from mill production and checked against the curve.

* * *

SAMPLE X is a .141″ wire with a tensile strength of 111,500 psi. The curve at 58% reduction of area shows 107,000 psi.

* * *

SAMPLE Y was .119 wire semi-killed 1010 wire with a tensile strength of 121,000 psi. From its reduction of 70.2% one would predict a tensile of 112,000 psi.

* * *

SAMPLE Z was .090″ wire with a tensile strength of 124,000 psi. The curve shows a tensile of 125,000 for a sample of 84.0% reduction.

TABLE C

Physical properties of 14½ ga. 1010 semi-killed steel wire drawn 5 drafts from No. 5 rod on a Vaughn 5/6 HR machine.

Dia. Inches	Tensile, Pounds per square inch	Percent Reduction of Area by drafting
.225	59,800 psi.	0
.175	98,800 „	39.5%
.1415	107,200 „	60.5%
.1115	115,800 „	75.8%
.0945	121,500 „	81.4%
.076	132,500 „	88.6%

Analysis of Steel (Semi-killed)

Carbon	0.11%	Sulfur	0.043%
Manganese	0.34%	Silicon	0.04%
Phosphorous	0.006%	Copper	0.36%

* * *

AS every wire mill man knows, there are many variables in wire drawing. Specifically some of the factors affecting the accuracy of the curves here presented are:

1. **Variations in chemical analysis, not only in the range of the usual elements but also the effect of stray alloying elements.**
2. **Rolling practice on rods including such factors as finishing temperature, degree of quench of cooling rate, etc.**
3. **Thoroughness of annealing, on processed wire.**
4. **Distribution of drafting surely has some effect although perhaps only of small magnitude in consistent wire mill practice.**
5. **Lubricants, drawing speed, die angles and attendant factors.**

* * *

IN summary it is thought that a reasonably accurate relationship exists between the tensile strength and the percentage reduction of area due to drafting, and that such relationship can be used in a practical manner to predict tensile strengths or processing sizes.

* * *

WITHOUT doubt further studies of correlated tensiles and drafting practices would lead to further information ranges of steel analysis and for other metals, which could be very useful to practical mill men.

THE WIRE ASSOCIATION 1946 CONVENTION

WILL BE HELD AT

HOTEL STATLER, BUFFALO, NEW YORK

OCTOBER 21-24, INCLUSIVE

For information and hotel reservations write

RICHARD E. BROWN, Executive Secretary

THE WIRE ASSOCIATION

300 MAIN STREET —:— STAMFORD, CONN.

A Review of Inhibitors

PART III — BIBLIOGRAPHY

By Wallace G. Imhoff, B.A., B.S., M.S., Met. E.,
President the Wallace G. Imhoff Company
Los Angeles, California

Technical Director of Research
American Hot Dip Galvanizers Association, Inc.
Pittsburgh, Pennsylvania

FOREWORD

This review of Inhibitors was presented before the Wire Association Meeting in San Francisco, California, on June 7th, 1946.

The author's object in presenting this review is First to summarize all the work done by others on this subject and Second to attempt to explain clearly what he says takes place when Inhibitors are used in acid pickling baths.

Inhibitor Bibliography

1896 Meurice, Albert. Sur le Decapage on Trefilerie. (In Bulletin de l'Association Belge des Chimistes, v. 9, p. 343-358.)

The same, abstract translation, 1896. (In Journal of the Society of Chemical Industry, v. 15, p. 454–455.)

1903 Meurice, Albert. Sur le Decapage on Trefilerie. Abstract translation (The Metal Industry, N. Y. v. 1, p. 114.)

States that arsenic may be advantageous to an acid pickle, since when present in suitable proportion it reduces the consumption of acid while increasing the effectiveness of its work.

1905 Burgess, Charles F. Some Observations on the Influence of Arsenic in Pickling Solutions. (In Transactions of the American Electrochemical Society v. 8, p. 165–170.)

1918 Corbett, E. E. The Chemistry of Pickling Baths, U. S. Bureau of Mines Paper 1918; Automotive Industries, v. XXXIX, p. 960.

1918 Wiard, W. H.—Arsenic. Chem. Analyst v. 25, 10-1 (1918).

Effect of arsenic in sulfuric acid on rate of solution of iron. When the concentration of As in the sulfuric acid 60-66 degree Be., reaches about 0.003% the rate of solution of the iron is reduced to approximately one fifth that shown by an arsenic-free acid.

1920 Griffin, Roger C. The Solubility of Metals in Acids containing Formaldehyde. (In Journal of Industrial and Engineering Chemistry, v. 12, p. 1159-1160.)

Deals with the use of hydrochloric acid containing 1 per cent of formaldehyde, which secures pickling of rusty steel without any effect on the steel itself.

1920 "Pickelette" (In Iron and Coal Trades Review, v. 101, p. 763.)

Brief description of new pickling mixture.

1920 Richardson, William D. The Solution of Metals in Acids as Related to Corrosion. Electrochemical Society, Cleveland, O. Oct. 2, 1920. p. 180. Behavior of Organic Catalyst, Formaldehde.

1921 Compound for Control of Acid Fumes in Pickling. Forging and Heat Treating, v. 7, p. 421.

Developed by Hoffman Process Company, Pittsburgh, Pa.

1922 New Pickling Compound. (In the Metal Industry, N. Y., v. 20, p. 403.)

"Sumfoan" Compound, said to protect cleaned metal from action of acid after scale removal.

1922 "Commercial Rust Remover and Pickling Compound." (In American Machinist, v. 57, p. 825.)

1922 Abstract from the "Alkali Inspectors Report" for 1922. Presents experimental data on the comparative efficiencies of pickelette acid, tragon, gelatin, and cresol acid as restrainers in picking tin-plate.

1923 Improved Pickling Methods. (In Metal Industry, London, v. 23, p. 413-414.)

States that pickling department is based entirely on a non-scientific system and suggests remedies. Includes brief discussion of "pickelette".

1923 Sieverts, A. and Lueg, P. Vergiftungserscheinungen bei Chemischen Reaktionen (Insbesondere der Aufloesung von Metallen in Saeuren). (In Zeitschrift fuer Anorganische und Allgemeine Chemie, No. 126, p. 193-225.)

Treats of the toxic effect of hydrochloric or sulphuric acids due to the addition of organic compounds. On p. 195-207 gives results of tests conducted during pickling of wire.

1924 Addy, Mathew, Co., Pickelette; Acid Saver and Beneficiating Agent. Contains a brief discussion of pickling, and numerous useful tables.

1924 American Chemical Paint Company. "Pickling Made Efficient with Rodine Extract." Bull. No. 15. Deals with the Chemistry involved in pickling and shows photomicrographs of surfaces under various conditions of treatment.

1924 Feb. Chem. Age. Formaldehyde to Increase the Efficiency of Pickling Baths in Steel Mill Practice. Patent – Chem. Age, v. 32, 100. F. '24.

1924 Sept. 5 Edwards, C. A. Pickling, or the Action of Acid Solutions on Mild Steel and the Diffusion of Hydrogen Through the Metal. The Jour. of Iron & Steel Inst., v. XV, p. 11. Autumn Meeting, Sept. 4, 5, 1924.

1925 Vogel, Otto, Dr. Vogel's Beiz-Zusatz. (Vogel's Sparbeize D. R. P. und Auslendpatente) Ed. 5, 1925.

Description of inhibitive properties and uses of author's patented pickling compounds.

no date Mesta Machine Company, Pittsburgh, Pa. "Modern Pickling with the Mesta Pickling Machine." 12-page booklet. Inhibitors discussed page 6.

1926 Bailey and Lindner. Pickling of Tin-Plate. (In Metallurgist, v. 2, p. 100-101.)

Abstract of an article in 1922 report of "Chief Inspector of Alkali, Etc. Works." Gives results of experiments to lessen the evolution of hydrogen during pickling, since it carries with it into the atmosphere of the pickle room a large amount of acid fumes detrimental to health.

1926 Batta, Georges. L'Action de la Formaldehyde sur la Dissolution de Fer dans Acids. (In Bulletin de la Society Chimique de Belique, v. 35, p. 393-411.) Discusses the effect of formaldehyde on the solution of metals in acids. At concentration, one per cent of formaldehyde may inhibit the solution of iron alloys in hydrochloric acid; the rate sometimes is decreased as much as 90 per cent. This rate is common to aldehydes in general. Detailed data covering a large number of experiments is tabulated.

Published in Four Issues
Part I — Section A — Review, June 1946
Part I — Section B — Review, July 1946
Part II — U. S. Inhibitor Patents, Aug. 1946
Part III — Bibliography, September 1946.

1926 Hansen, J. E., and Lindsey, G. S. Some Factors Influencing the Rate of Pickling Sheet Iron. (In Journal of the American Ceramic Society, v. 9, p. 481–492.)

Study of the effect on the rate of pickling of varying factors which exist in the acid bath in which sheet iron is pickled.

1926 Creutzfeldt, W. H. Ueber Sparfiusaetze zu Beizbaedeon in der Metallindustrie. (In Zeitschrift fuer Anorganische und Allgemeine Chemie, No. 154, p. 213-219.)

Study of loss of weight of iron and steel and increase of brittleness of wire after pickling in sulphuric acid alone, and with additions of various organic substances.

1927 Batta, Georges. Application of Catalysis in the Pickling of Metals by the Action of Solvents. (In Chemical Abstracts, v. 21, pt. 2, p. 3333.)

Abstract of article in "Chimie et industrie", v. 18, pt. 2, 384–387. Discusses the addition of formaldehyde, proprionaldehyde, butylaldehyde, benzaldehyde, etc. to pickling solution and their effect on the action of the solution.

1927 Speller, Frank N., and Chappell, E. L., Inhibitors — Their Behavior in Laboratory and Plant. (In transactions of the American Institute of Chemical Engineers, v. 19, p. 153-169. Discussion p. 161-163.

The same, abstract, 1927. (In Chemical and Metallurgical Engineering, v. 34, p. 421–423.)

States that small amounts of certain materials added to pickling solutions retard their action on the metal but not on the scale. This action is more marked with high acid concentration than with low. The action is apparently catalytic.

1927 Fatal Poisoning by Arseniuretted Hydrogen in the Galvanizing Shop at the Navy Yard, Puget Sound, Wash. (In United States Naval Medical Bulletin, v. 25, p. 754-762.)

Describes pickling process used, and claims that the poisoning may have been caused by conditions other than those found in the pickling room.

1927 July Speller, Frank N., Chappel, E. L., and Russell, R. P. Removal of Rust from Pipe Systems by an Acid Solvent. il. diag. Amer. Inst. Chem. Eng. Trans. v. 19, pp. 165–171 — 1927; Same Chem. & Met. Eng. v. 34, pp. 423-424, July 1927.

1927 Nov. 5 Use of Inhibitors in Metal Pickling. (In Chemical Age Monthly Metallurgical Section), London v. 17, p. 34.) Discusses briefly the control of pickling operations and gives an electrochemical explanation of the process.

1928 Iron Trade Review. Inhibitors Reduce Pickling Vapors. v. 83, p. 841.

1928 Rawdon, Henry S., "Protective Metallic Coatings." Addition Agents, page 59. Reinhold Publishing Co., N. Y.

1928 Bablik, Heinz. Zur Pruefung von Beizzusaetzen. (In Korrosion und Metallschutz, v. 4, p. 1790181). Discusses inhibitors used in pickling solutions, their efficiency and method of determining their inhibitive power.

1928 Esch. Werner. Ueber Metallbeizung. (In Chemisches Zentralblatt, v. 99, pt. 2, p. 1260.)

Abstract of article in "Gummizeitung", v. 42, p. 2309, 2310. Treats of pickling iron and steel products prior to galvanizing and the use of inhibitors.

1928 Creutzfeldt, W. H. Das Beizen der Metalle unter Anwendung von Sparzusaetzen. (In Korrosion and Metallschutz. v. 4, p. 102-107.)

Gives results of investigations on the influence of inhibitors on pickling solutions. Contains numerous diagrams.

1928 Eisenkolb, Fritz. Ueber das Beizen von Feinblechen. (In archiv. fur das Eisenhuettenwesen, v. 1, p. 693-698.) Treats of the use of hydrochloric and sulphuric acids, the actions of pickling solutions on metals, addition of inhibitors and effect of speed on the efficiency of pickling. Being chiefly the results of investigations conducted by the author.

1928 Kremer, (Dionys). Inhibitors Reduce Pickling Vapors. (The Iron Trade Review, v. 83, p. 841.)

By the use of inhibitors in pickling solutions the acid does not attack the metal while the oxide film is completely removed. Also no carbonic or arsenic oxides are formed thus eliminating the chief source of injuries to health.

1928 Jan. 28 Donnelean, J. Edward, Pickling; Inhibitors. See Pickling; General. A. S. S. T., January 28, 1928, pp. 2-3.

1928 May Muehlberger, C. W., Loevenhart, A. S., and O'Malley, T. S. Arsine Intoxication; A Case of Suspected Poisoning in the Steel Industry. (In Journal of Industrial Hygiene, v. 10, p. 137-146.)

Discusses case of arsine poisoning of workman in pickling room of Puget Sound Navy Yard. Gives a description of pickling process and claims that from analysis of material in pickling room that traces of arsine seem highly improbable as responsible for the condition. Contains a Bibliography of 76 references.

1928 June Chappell, E. L. and Others. The Electrochemical Action of Inhibitors in the Acid Solution of Steel and Iron. (Industrial and Engineering Chemistry, v. 20, p. 582–587.) Bibliography 587.

It was found that the decrease in metal solution due to the action of inhibitors, with accompanying hydrogen evolution proportional to the increase in cathode overvoltage caused by the inhibitors. Authors claim the inhibitive action is due to the formation of a layer of discharged inhibitor substance on the cathode areas.

1928 Sept. 27 Imhoff, Wallace G., Pickling Influences the Spangle on Zinc-Coated Sheets. Use of inhibitor cited. Iron Trade Review, v. 83, No. 13, Sept. 27, 1928, pp. 768, 769, and 780; 5 Figures.

1928 Dec. Forrest, H. O., Robert, J. K., and Roetheli, R. E. Effects of inhibitors on the Acid Solution of Copper and Copper Alloys. Industrial and Eng. Chem. v. 20, p. 1369–71. D'28.

1928 Dec. Bailey, K. C., Inhibition of Chemical Reactions; the Mechanism of the Inhibition of Chemical Reactions; the Mechanism of the Inhibition of Esterfication by Alkaline Substances. Chem. Soc. J. p. 3256-8. D'28.

1929 Jan. 3 Douty, Alfred. "The Use of Inhibitors in the Pickling of Steel." A paper read at the Regular Monthly Meeting of the Philadelphia Branch, American Electroplater's Society.

1929 January Alyea, H. N., and Backstrom, H. L. J., Inhibitive Action of Alcohols on the Oxidation of Sodium Sulphite. Am. Chem. J. 5-:90-109; Ja. '29.

1929 March 7 Ihrig, H. K. New Inhibitor Discovered for Protecting Pipe Coatings. Oil & Gas J., 27:266. Mr 7, '29.

1929 June 1 Starbuck, R. M., Jr. Removal of Rust from Old Pipes in Place. Dom. Eng. 127: 67. Je 1, '29.

1929 Aug.2 Warner, J. C. Organic Type Inhibitors in the Acid Corrosion of Iron. The Metal Industry, London, Aug. 2, 1929, p. 109. An excellent article on the chemistry of inhibitors; also gives names of inhibitor bases, etc.

1929 Sept. Chappell, E. L. Inhibitors as a Means of Reducing Corrosion. Chem. & Met. Eng. Sept. 1929, p. 539.

1929 Sept. 5 Turnbull, A. D., Inhibitors in Pickling Process. The Iron Age, v. 124, pp. 598-600; Sept. 5, 1929.

1929 Oct. Taussig, Von Karl, Pickling — Ueber das Beizen. Archiv. fur Eisenhuttenwessen Oct. 1929. pp. 253-266. Very extensive article covering the use of inhibitors.

1929 Oct. Metal Cleaning and Finishing. "The Influence of Corrosion Accelerators and Inhibitors on Fatigue of Ferrous Metals." p. 544.

1929 Nov. Rhodes, F. H., and Kuhn, Wayne E. Inhibitors in the Action of Acid on Steel. Industrial and Engineering Chemistry. v. 21, No. 11, Nov. 1929; pp. 1066-1070.

1929 Nov. 7 The Iron Age. Pickling—Acids—Tests During Pickling. Arsenic in Pickle Baths. v. 124, p. 1238.

1929 Dec. Metal Cleaning and Finishing. Evolution of Inhibiting Action. Vol. 1, No. 8, December 1929, page 692.

1929 Dec.13 American Metal Market. "How Inhibitors Act in Pickling Solutions."

1929 Rolf, R. Proper Pickling Practice. American Metal Market Monthly Review Section, p. 6.

1929 Chemical Products Co., Chicago, Ill. "Pickling". A small green booklet of 49 pages discussing pickling genrally. Pages 21–23

(Please turn to page 699)

CORKSCREWS

A topic of interest to most wire men.

TO many persons, a corkscrew is a squiggly gadget which pulls corks out of bottles, sometimes. To the wine industry, a corkscrew should be a device which pulls corks out of bottles — every time. No embarrassing cork-pulling failures, please, when wine is about to be served.

* * *

AND yet the incidence of misfires has been high. Why? Why should some corkscrews work better than others? The wine industry decided to find out. Scientific tests on corkscrews were conducted by the Wine Institute for the Wine Advisory Board. From these tests came a 30-page illustrated report, with recommendations for corkscrew specifications. This now is in the hands of leading American manufacturers of the implements.

* * *

THE opening of bottled wines, the use of which has increased more than 250 per cent in a decade, is believed to represent the principal present and future use of corkscrews in the United States. Although other closures have been adopted by many vintners, corks still are generally preferred for many wines.

* * *

FOR the tests the Wine Institute proceeded with the advice and assistance of Dr. Leonard B. Loeb, Professor of Physics at the University of California, and had the cooperation of the I. F. Schnier Company, cork distributors. The facilities of the Smith, Emery & Co., testing laboratory in San Francisco were used.

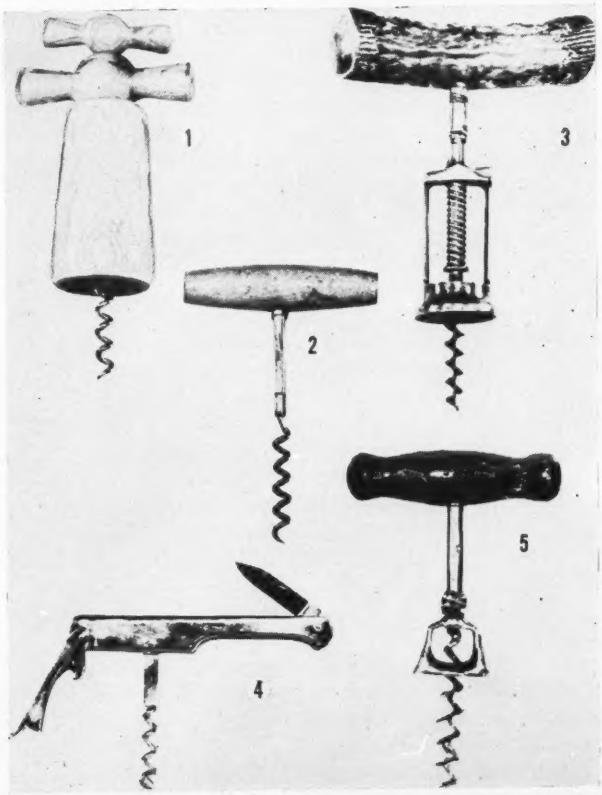
* * *

TWENTY-THREE corksrew worms, each differing from the other in some point of dimension or material, were subjected to carefully measured tests. One of the most conclusive of these tests was that in which readings were taken of the force needed to pull the screws out of corks cemented in place. This test showed that the gripping power of the best specimens was twice that of the poorest.

* * *

RESEARCHES found that bent-wire and steel-web corkscrews with hollow centers worked more consistently than auger types with solid shanks; that the latter apparently weakened the cork-centers and pulled out through the corks too easily. They also learned that very sharp-edged screws were least preferable because they were most likely to tear the cork. Better results were obtained with a worm whose point was so located as to make a path that was followed by the center of the spirals. When the point was off line with the spirals, a tearing action occurred within the cork. The corkscrews giving best results had a diameter of .35 inch or slightly more and a uniform distance between threads (measured along the axis) of .40 inch. It also was determined that greater effi-

(*Please turn to page* 690)



Test conducted by the Wine Institute on corkscrew worms to determine which type of construction was most efficient in removing corks from wine bottles, resulted in the above five achieving most satisfactory results numbered in order of overall performance. The four leverage devices indicated these did not enter into the tests but it was found that some kind of leverage is essential for virtually all corkscrews intended for opening wine bottles. * * * * * * *

Wire Drawing Machines—Past, Present and Future

by N. Davidson, Esq., A.M.I. Mech. E. — Assoc. M. C. T.
Technical Director, Sir James Farmer Norton & Co., Ltd.
and General Manager, Wire Drawing Dies (Manchester), Ltd.

A paper presented before the Staff School of Frederick Smith & Company, Wire Manufacturers, Ltd., Halifax, England.

WHEN I was asked to submit a paper on the past, present and future of the wiredrawing machine, I thought it would be necessary to wade through various text books, collecting information and data and presenting it to you in chronological order. It was quite a relief, therefore, to find that past history should only go back as far as 1930 and any observations made would be within the memory of us all.

* * *

THE introduction of the tungsten carbide die in the early 1920's was the direct cause of revolutionary changes in production methods. Previous to this discovery, the types of wiredrawing machinery in the steel trade were practically all based on similar principles. The standard block bench was simply a number of single blocks having speeds suitable for roughing, intermediate and finishing. They were designed with robust main shafts driven by a single motor and reduction gear, the power being transmitted from the horizontal shaft to the vertical block shaft by means of heavy cast iron bevel gears. Usually, these gears were machine moulded, not machine cut, and consequently absorbed much power. The drive between the vertical bevel shaft and the block was transmitted by friction clutches or dog clutches.

* * *

DESIGNERS had foreseen the possibility of drawing a number of holes in sequence and the differential block was introduced. This consisted of a series of drawing capstans driven at different speeds by differential mechanism, the finishing block and capstans being on the same spindle. For many purposes they functioned admirably but due to their construction on a single spindle required much maintenance and became overheated on long runs. There are, of course, many types of mechanisms known to the engineer which give differential speeds but unfortunately no die had been discovered which could stand up to the wear and tear necessary for continuous production. It was further found that the draftings necessary to make such machines function satisfactorily had to bear a definite relationship to the speed of the drawing capstans. Consequently, a certain drafting was found to give the best results, and anything different produced slip on the drawing cones, resulting in grooving and excessive maintenance costs.

* * *

THE Wire concerns, however, had their own engineering staffs who designed and manufactured machines on different principles. Unfortunately, no record of their efforts has been published for the benefit of the Industry as a whole. We understand the machines were designed primarily to draw a number of reductions simultaneously with no slip occurring between the drawing drums and the wire. Consequently, a series of drums or capstans were driven positively at speeds in excess of the wire speed at each reduction stage. These capstans had loose split outer rings which tightened on to the driving drum during the drawing operation, the necessary slip being dissipated between the capstan and loose ring. This was really a very ingenious method, but unfortunately continuous slip produced excessive heat and friction with high maintenance costs.

* * *

FURTHER efforts were made behind the scenes to design machines on different lines, one manufacturer installing machines with main drives situated beneath the floor level. The design of the finishing block was of special interest, this being inverted. Bundles of wire could be drawn and stripped without the necessity of lifting devices.

* * *

CONTINUOUS wiredrawing machines, drawing from capstan to capstan had been introduced on the finer sizes but these were all based on slip principles and unsatisfactory for heavier sizes. Their success depended upon the life of the die and this was only possible on finer sizes on account of the diamond die which had been in existence for many years.

* * *

IN 1930 we were in the midst of trade depression and although the tungsten carbide die had been formally introduced into English practice, the machines in general were of obsolete types requiring replacement. About this period, rumours were circulating of different methods of production, due to the introduction of the synthetic die. The German designers of machines were introducing new types of machines on the Continent. The Americans had installed machines of the **Connor Slinger** type or the **Morgan Connor** and little was known in this country of their efficiency. We are very conservative or, at least, we were in 1930, but the competition in the depression made us realise what we were up against.

The enquiries received by my particular firm were for designs which were entirely different from the standard products. To be successful in the depression period one has to produce efficiently and as economically as possible. The larger manufacturers had previously made their own equipment but it was realised that the established engineering concerns had facilities for producing better equipment. Designs on revolutionary principles had to be evolved. Blocks had to be water cooled, drawing speeds advanced and new techniques as regards maintenance of tungsten carbide dies introduced. Very little was known of the methods of production abroad and manufacturers of wire machinery in this country had nothing of a revolutionary nature to offer to an industry which insisted on re-organising.

* * *

WITH your permission, I would like to record an experience of 1931, since this laid the foundation of the numerous plants my firm has manufactured since that period. One day an agent called at our Works, dispirited, dejected and utterly discontented with trade prospects. He was endeavouring to introduce wiredrawing machinery on behalf of a German firm and had been trying to sell machines to the British trade for three years without success. Not a single machine had been installed and yet German designs and catalogues illustrated machinery more advanced in design to anything in this country. We immediately went to Germany and inspected their methods of production and were very much impressed. On returning and reporting our findings to firms who were interested but dubious, we arranged for their representatives to pay similar visits. They in turn were much impressed and we purchased outright the patents and drawings of the equipment for Britain and the Empire.

* * *

ON the Continent, the tungsten carbide die had been firmly established, rods were welded and the machines were practically continuous. Machines designed on non-slip principles were in operation and a number of multiple hole machines could be serviced by a single operator. In principle, they were similar to present day plants. No longer was it necessary to reduce the rod by single holing. On mild steel the whole reduction from the rod to 19g or 20g could be accomplished by a single operator, reducing all the passes simultaneously, thus saving much labour and handling. By welding the rods whilst the machine was in production and using strippers on the finishing blocks, production was almost continuous.

* * *

EACH block being driven by its own motor enabled the control of the machine to be operated from any point. The operator could stop any particular block from any position. Should the wire break, it could be arranged for the whole machine to close down automatically or only the blocks preceding the break, leaving the remaining blocks still in production.

* * *

IN introducing these revolutionary designs to English wire manufacturers, it was necessary to modify them to suit English practice. No firm could visualise employing numbers of such machines producing the same wire and quality from day to day. It was necessary to arrange that each block could be used as a finisher if desired. The machines had to be made to suit mild steels and high carbon steels. Better designs of die boxes had to be introduced and overhead take off developed to suit different conditions. After the first few machines installed, we discarded the original German designs and introduced the unit construction model, having an intermediate texrope drive and worm reduction. This was immediately successful and is still the basis of our present day machines.

* * *

FROM 1931 to 1936 it was necessary to overcome much preiudice from many angles. It could not be expected that the skilled wire drawer, with a lifetime of skill behind him, would take kindly to the introduction of the carbide die. In addition, he was now required to produce finished wire irrespective of the number of reductions at fixed prices, whereas previously, he had been paid per hole. The quality of the product was under suspicion for some time but this was not borne out by actual facts. In practice the quality of the product was much improved, due to the water cooling of the blocks and dies at each particular stage. Moreover, although the preliminary reductions of the wire were carried out at a much slower speed than previously, the finishing speed of the final reduction was much greater than formerly. Due to accumulation on each block, the wire, after each reduction, was allowed a "resting" period before proceeding to the following reduction. This was found to be a valuable asset on the high carbon steels and resulted in obtaining specifications previously unattainable.

* * *

THE saving in power costs amounted to a formidable figure over a period. In machines driven by a single shaft, it was necessary to have a large motor to undertake all that was required of the bench. If only part of the bench was in operation at any particular time, it was still necessary to use the motor but at considerably lower efficiency. The main driving shaft had to necessarily continue rotating throughout the whole of its length, with consequent heavier maintenance costs. In the event of a break-down of the main motor or switchgear, the whole machine was, of necessity, closed down. With individual blocks these difficulties were eliminated, only the power used in actual production being consumed. Moreover, at all times, the motors were running at maximum efficiency, thus reducing the power factor. It was found possible with individual units to have all the parts interchangeable. Should a single unit need overhauling, the remaining units could function as a complete machine. Within a few months of receiving their new equipment, the manufacturing concerns had discovered that their costs were greatly reduced and it was necessary for us to design models on similar principles for finer gauges.

* * *

BY 1936 we had introduced models to draw on non slip principles

from 00 gauge to 36 gauge, the full range being represented GM 1 Heavy, GM 1; GM 2; GM 3 and GM 4 models. Improvements are always being introduced but in principle these models represent the most modern equipment introduced from 1930 to the present time. They have been introduced into the Industry according to the individual requirements of each particular firm. Some are driven by A.C. slip ring motors, others by D.C. or A.C. commutator motors, others by triple pole A.C. and the latest designs by a special type of motor to suit the utmost flexibility required by the Industry.

* * *

THE machines we introduced for wet drawing had to overcome many obstacles, particularly in the high carbon steel trade. It was necessary to make sample machines, demonstrate new techniques coating and lubrication before firms were ready to consider their plants obsolete. Troubles were, however, only to be expected when introducing revolutionary methods and within a few years the fine wire industry had fully modernised their equipment. These machines are represented by the TF 2A, TF 3 A and TF 3B, now used extensively on the higher tensile steel wires, a smaller number being installed for the mild steel trades. The main revolutionary feature of these cone machines, was the fact that the whole of the drawing operations could be undertaken whilst completely submerged in lubricant.

* * *

THIS period, 1930 to 1946, is to my mind an historic period in the wire industry. Other machinery makers were concentrating on alternative methods of production and making experimental machines of various designs. The invention of the synthetic die had caused machine designers to think on entirely different lines to the previous years. One firm in particular had invented a unique design, whereby the finishing block remained stationary, the finished coil pouring on to a static former, the die revolving around it. This idea is very interesting inasmuch as it represents something different from the standard principles and although it is somewhat similar to the patent stationary block, taken out by another Company in 1921, one wonders why it has not had a better reception in the trade. Maybe it is due to the fact that each lap of wire introduces a twist which is regarded as detrimental to the wire and may cause casting difficulties. Furthermore, rope makers may have difficulty when stranding.

* * *

THE other type of machine which represents original thought where D.C. is available is that known familiarly as the **Vaughan** type, a similar type being made by machine makers in this country. This design consists of a series of drawing capstants in tandem, the speed of each being controlled by a swinging arm operating the electrical gear and controlling the speed of each capstan, automatically, to suit the elongation of the wire at each stage. It is supposed to function automatically, irrespective of drafting sizes but on account of the high cost of electrical equipment, is very costly to produce. Before plant can be installed with machines of this design, it is essential to consider the high costs of direct current installations and the lack of flexibility in the arrangement. The wire passes from capstan to capstan almost immediately, with practically no resting period such as that obtained on blocks based on reservoir principles. Wire drawers of the old school remember the practice of giving the coil a rest before a further reduction. It was thought that the metallurgical structure of the wire, having been drastically upset by drawing, required a minimum length of time to recuperate before the molecules were ready for further punishment. There is something in this theory inasmuch as it is possible to draw wire, test immediately and obtain better test results after the wire has been laid aside for a period.

* * *

OTHER designs of interest were the **Morgan Connor** type in which the wire was drawn on reservoir principles, the wire being guided through the block spindle by guide pulleys to the following die box. The principle of reduction was in many ways similar to the GM machines, the main difference being in the method of guiding the wire from block to block. Various drives were incorporated in single and multiple machines, clutches, coil clutches, hydraulic couplings and recently the fluid coupling drive.

* * *

THESE are all very interesting and show the interest the engineer is taking in improving designs. A few years ago it was most difficult to interest engineers in wiredrawing machinery but nowadays many principles which have proved satisfactory in other spheres are being incorporated in wire machinery design to the ultimate benefit of the industry.

* * *

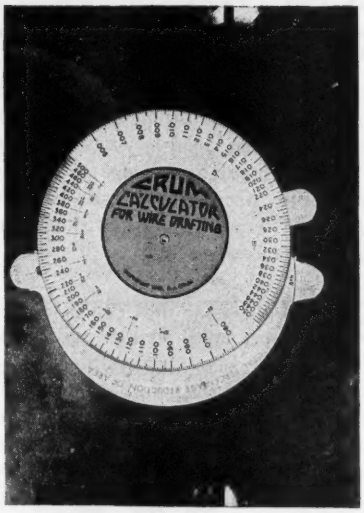
WHEN purchasing new machinery, the manufacturer is always concerned with speeds of production. To the engineer this is not a difficult problem inasmuch as it is just as easy to manufacture machines to work at high speed as at lower. It is simply a matter of good design and sufficient horsepower. The manufacturer should, however, be concerned that the gearing and driving mechanisms of any machines are capable of transmitting the full horsepower at the lower speeds with an adequate factor of safety, this deciding the strength of gears to be included. What should decide the speed of drawing is the processing and separation of the wire before drawing. Our latest installations have been provided with speeds twice as fast as those in operation three years ago, but we never advocate the use of such speeds under present conditions, knowing the limitations which influence them. Too many variable factors have to be controlled before high speeds of production are universally employed. Let us consider these factors for a moment, since they greatly influence the future designs of wire machinery. Let us assume that the manufacturer can obtain rods which are found to be perfect on analysis, constant in hardness and true to gauge within commercial limits. The

(*Please turn to page* 690)

The Crum Calculator for Wire Drafting

Provides answers simply and accurately for a given mathematical wire drafting problem. One setting shows number of holes, percentage of draft per hole, total reduction in area and intermediate die sizes to be used. Covers drafting range of .500″ to .005″. Accurate enough for most mill conditions.

* * *



Simple to operate; compact enough to carry in vest pocket; can be used for Metric as well as English systems; all diameters given in decimals. A handy and time-saving device that will eliminate time-wasting and possible errors in calculations.

* * *

EXAMPLES OF PROBLEMS SOLVED QUICKLY BY USE OF THE CALCULATOR

PROBLEM No. 1

DETERMINE the reduction of area in drawing ¼-inch diameter rod to .120 inch wire.

PROBLEM No. 2

SUPPOSE that in Example 1 the tensile strength of the stock is such that the drawing process produces a tensile strength of 100,000 pounds per square inch in the .120 inch wire. To develop the same tensile strength in an .080 inch diameter wire, what stock size is required when the tensile strength of the stock is assumed to be the same as that in Example 1.

PROBLEM No. 3

IN the drafting of .0625 inch diameter wire to .025 inch, no single draft must exceed 21 per cent. Determine the minimum number of holes for this job.

* * *

THE Crum calculator is designed especially for wire drawing jobs involving eight or fewer drafts. Problems involving a greater number of drafts can be solved, however, with extra manipulation. For instance, if it is desired to set up a multi-draft machine to draw .0095 inch diameter wire from .0625 inch stock in sixteen drafts, the intermediate die sizes can be determined by the calculator.

PROBLEM No. 4

A CERTAIN five-block continuous wire drawing machine has a capacity permitting a draft of 33 per cent per hole on low carbon wire. For economic reasons it is desired to find the largest stock size that can be used when finishing .0455 inch diameter wire on this machine.

* * *

PROBLEM No. 5

A continuous machine is to be set up to draw .0375 inch tire bead wire six holes from .122 inch diameter stock. All drafts are to be equal in percentage reduction of area. Determine "a" the intermediate die diameters; "b" the per cent reduction of area per hole; "c" the total per cent reduction of area from start to finish.

PROBLEM No. 6

THE diameter of the finishing block of a double-deck wire drawing machine is twenty-four inches; the diameter of the first block, seventeen inches. The operator wishes to finish .142 inch diameter wire from No. 5 rod and therefore must determine (a) the minimum draft for the finished die, (b) the minimum first die size, (c) and the first die size when a slippage of ten per cent is allowed.

* * *

HOW TO ORDER

The price is $5.00 each. A discount of 10% on ten or more.

Send check or purchase order to

WIRE AND WIRE PRODUCTS

300 MAIN STREET STAMFORD, CONN.

GOVERNMENT WIRE PRODUCTION INFORMATION

Nail Production Increase Planned

PLANS to provide a substantial increase in the production of wire nails, vitally needed for the Veterans' Housing Program and other essential projects, were discussed by the Civilian Production Administration with the newly formed Wire Products Industry Advisory Committee at a recent meeting.

* * *

THIS action was initiated at the re quest of Wilson W. Wyatt, National Housing Expediter.

* * *

AT the same time, industry members assured CPA that bale tie production would also be increased to a rate that will meet current farm requirements in harvesting 1946 crops. This production increase will be effected chiefly through funneling an increased amount of wire rods to non-integrated bale tie producers.

* * *

RAIL production could be increased to a level sufficient to meet not only the Veterans' Housing Program but all other essential demands, if this product was granted a sufficient price increase to assure profitable production and if free operating conditions prevailed, industry spokesmen said.

* * *

EMPHASIZING that despite the steel and coal strikes nail production has been maintained at a rate during March and April comparable with the 642,931 tons produced in 1945, industry reported that the demand for the Veterans' Housing Program was superimposed on otherwise peak peacetime production requirements.

* * *

RAIL requirements for 1946 were estimated at 795,000 tons and 835,000 tons in 1947, according to James Sedkwick, Chief of the Wire Unit in CAP's Steel Branch.

ADMIRAL Kirby Smith, General Deputy Expediter of the National Housing Agency stated that Veterans' Housing needs would required 248,379 tons out of 1946 production and 312,795 tons of nails next year.

* * *

ONE of the principal difficulties in increasing nail production, according to the committee, is the substantial difference in current nail requirements compared with war demands. They pointed out that present housing requirements call principally for 1-20 penny nail sizes which number many times the units to the ton, compared with the 40 to 60 penny sizes which were used in quantities during the war. This change in demand, of course, reflects the changeover from large structures such as barracks and cantonments to individual type homes.

* * *

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

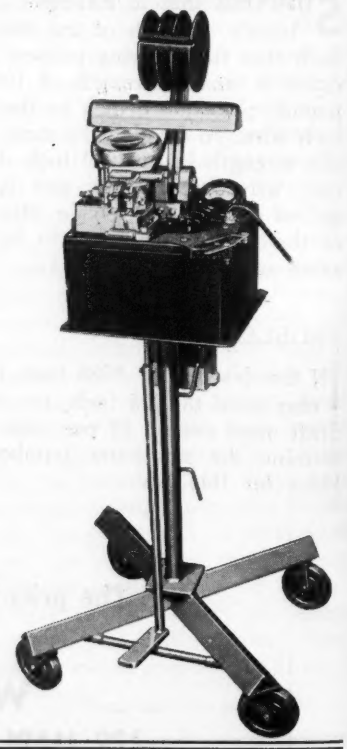
MODEL M-T MICRO-WELD BUTT WELDER

This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, make it ideal for the fine wire manufacturer.



MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

Telephone, State 7468

RECOGNIZING the urgent need for increased nail output, one representative of a leading producer promised that his company would attempt to increase production by 30 per cent. Another promised a 12 per cent increase while a non-integrated producer indicated a 100 per cent production jump of the hot mills (integrated producers) would make sufficient wire rods available.

* * *

IN reviewing the bale tie situation, CPA told members that approximatel 110,000 tons were needed this year compared with an indicated 80,000 ton production. Increased harvests of hay and other crops accounted largely for the higher demand. Furthermore a new type of baling machine, which uses more wire per ton of fodder than some of the older type machines, has also accentuated the demand.

* * *

CPA officials and industry agreed that the best method to increase bale tie production was to channel more wire rods and wire to the non-integrated mills because most of the integrated mills are currently at capacity production on bale ties.

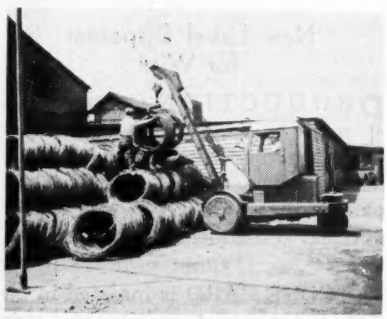
* * *

All-Around Utility Mobile Crane

KRANE KAR is a Mobile Power Swing Boom Rubber Tired Crane, manufactured by the **Silent Hoist & Crane Co.**, Brooklyn, N. Y.

* * *

ITS ability to be used inside and outdoors, has made it adaptable



KRANE KAR

for a general utility crane. Because it is equipped with large traction and steering wheels, it is capable of operating over the average road-

AN OPPORTUNITY

An internationally known Cleveland manufacturer who has spent ten years engineering and developing a complete line of proven special machinery and equipment for use in an industry closely related to wire and steel, due to other interests, offers for sale the complete manufacturing rights, engineering, research, development, backlog of orders, parts, stock and other items necessary to manufacture his complete line successfully and efficiently.

Backlog of orders approximately $175,000. Annual demand $350,000 to $500,000.

This is a wonderful opportunity for a manufacturer who needs new or additional products to invest upwards of $100,000 for this profitable, proven internationally known line of machinery and equipment which has an ever-increasing demand. Seller would be glad to obtain sales rights for the domestic and export markets on commission basis. All inquiries in strict confidence.

WRITE BOX 437, WIRE & WIRE PRODUCTS

USE - - -

WIRE and WIRE PRODUCTS

– A Good Advertising Medium –

When you plan your advertising, if you sell machinery, equipment, supplies or wire to our industry—to the concerns making wire or to those who fabricate wire products, it will pay you to include WIRE AND WIRE PRODUCTS in your new advertising schedules.

Wire and Wire Products goes to the production executives of the industry, and these are the men that must be "sold" if your products are to be used in their mills.

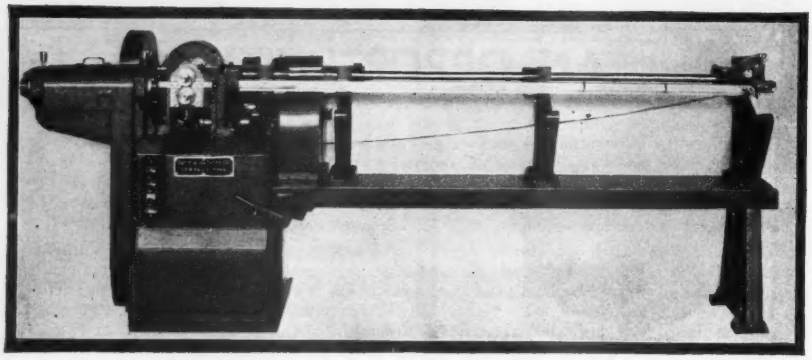
Your advertising story in Wire and Wire Products reaches these men in an editorial atmosphere related to their own problems and reaches them with a maximum of efficiency.

So back up your salesmen and direct mail efforts by taking appropriate space in Wire and Wire Products. For rates and other data, please address

WIRE and WIRE PRODUCTS

300 MAIN STREET • STAMFORD, CONN.

Edmund D. Sickels, Advertising Manager



TYPE 1A — CAP. 1/16" to 3/16" DIA.

•

STRAIGHTENER SPECIALISTS
FOR OVER 80 YEARS

developed in that time —
Some of the refinements

Almost continuous wire travel
Lightening cut-off that assures square ends
High-speed, direct-driven 5-die straightening flier
Quiet, efficient V-belt drive
Ball & roller bearings thruout
Extreme rigidity
Types for capacities from 1/32" to 11/16" diameter

DESCRIPTIVE FOLDER
SENT ON REQUEST

THE F. B. SHUSTER MFG. CO., INC., NEW HAVEN, CONN.

SHUSTER SINCE 1866

Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

way around plants and yards and, at the same time, because of its compact width, height and length dimensions, it can be used with equal efficiency inside a plant.

* * *

THE operator has ready access to the controls for hoisting, swinging and topping the crane or for traveling forward and back. One engine provides power for the crane mechanism and for traveling. The chassis is fitted with either a gasoline or diesel engine and equipped with electric lighting and starting accessories.

* * *

A UNIQUE development is that power hoisting and lowering provide the same ease of operation available with electric cranes, but having the advantages of economy and efficiency of the gasoline engine drive.

* * *

KRANE KAR is used extensively for loading freight cars, trucks, trailers, for storing and stacking materials in yards, for lifting and transporting materials about production lines and for general maintenance work, setting up machinery and other repair applications.

* * *

KRANE KARS may be fitted with electric magnets or clamshell buckets which broaden their field of application. They are available in 3 standard sizes, Model A, 5000 lbs. capacity, AX 10,000 lbs. capacity, AY 20,000 lbs. capacity. Details gladly furnished on request.

* * *

New Label Dispenser for Wire

PRODUCTION Operators can mark wires readily by using a new label bench dispenser recently developed by **W. H. Brady Company**, manufacturers of QUIK-LABEL self-adhesive wire markers.

* * *

A CODE CARD is inserted in the dispenser. A removable strip at the top of the card comes completely off, automatically exposing the top end of each label. The slot in the dispenser firmly holds the card so the operator does not have to pick up and put down the card

each time a label is peeled. The dispenser leaves both hands free for work.

* * *

TIME studies indicate that QUIK-LABELS with self-starter strip and Bench Dispenser are economical to buy and apply. These labels come with 33, 66 or 99 individual labels on a code card.

* * *

OTHER recent QUIK-LABEL developments include an improved "Self-Starter Strip" and a silicone plastic coating which renders the labels resistant to dirt, grease, oil, fumes, and abrasion.

* * *

THE dispenser is furnished to QUIK-LABEL users at no charge. It is described in an illustrated folder which will be sent gratis by the **W. H. Brady Company**, 2900 N. E. Linnwood Ave., Milwaukee 11, Wisconsin.

* * *

New Bulletin on Hardening Methods

HARDENING in Surface Combustion Standard Rated Furnaces is described in new 4-page Bulletin No. SC-131 just issued by **Surface Combustion Corporation,** Toledo 1, Ohio.

* * *

THE bulletin gives a brief resume of hardening practices and shows a photo micrograph of steel in the spheroidized and in the hardened state. Ideal types of furnaces for various methods of hardening are shown together with illustrations of hardened steel parts and actual furnace installations. These include oven, pot, and atmosphere hardening furnaces as well as isothermal quench furnaces.

* * *

A TABLE giving Ms points for some steels is included.

* * *

Wood Joins Loewy Construction Company

FRANK J. Wood, formerly with **Goodman Mfg. Co.**, Chicago, has joined **Loewy Construction Company, Inc.**, of New York as Chief Engineer of the Rolling Mill Division.

* * *

MUSIC Spring Wire

Uniform by all the measurements of quality spring wire. Use Keystone Music Spring Wire and manufacturers' wire to satisfy your most exacting requirements.

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Outstanding Personalities of the Wire Industry

Rosse Appointed Export Manager Colorado Fuel & Iron Corporation

E. P. **HOLDER**, President, announced today the appointment of **Matthew R. Rosse** as Export Manager for the **Colorado Fuel and Iron Corporation**, including all divisions and subsidiaries.

* * *

MR. Rosse has been Export manager of Wickwire Spencer Steel, a division of the Colorado Fuel and Iron Corporation since 1943. Previously he was associated with the American Chain and Cable Company.

* * *

MR. Rosse's headquarters will continue to be located at 500 Fifth Avenue, New York 18, New York. Currently Colorado Fuel and Iron Corporation is planning expanded activities in foreign markets. In addition to the Wickwire Spencer Steel Division, other parts of the Colorado Fuel and Iron Corporation which will be under Mr. Rosse's direction are the Colorado Division and the California Wire Cloth Corporation.

MATTHEW R. ROSSE,
Export Manager,
Wickwire Spencer Steel Div.,
Colorado Fuel & Iron Corp.

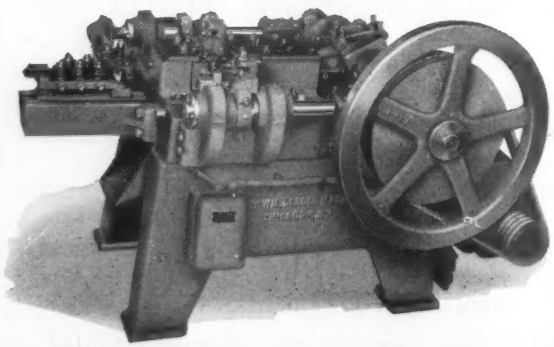
* * *

Reynolds Wire Company Elections

THE Reynolds Wire Company of Dixon, Illinois, has elected the following officers: **R. A. Joslyn** to Vice-President; and **Harold Rorer**, Treasurer of the Company for 17 years, to be a Director. This election follows the retirement of **L. G. MacDonald**, Vice-President and director of the company after 19 years of service. Mr. Joslyn has been Purchasing Agent with the company since 1937.

* * *

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS
210 No. Racine Ave.
Chicago 7, Illinois

Roebling's Sons Company Announces Promotions

E. C. **Low**, vice-president in charge of sales, **John A. Roebling's Sons Company**, Trenton, N. J., announces the promotion of **Forest S. Burtch** to manager of sales, wire rope division, and **William Hobbs, Jr.**, to manager of sales, aircord division.

FOREST S. BURTCH,
Manager of Sales Wire Rope Div.,
J. A. Roebling's Sons Co.

* * *

BURTCH, a graduate of Syracuse University, succeeds Earl N. Graf, recently resigned. He joined the staff of the Roebling wire rope engineering division in 1923, and, later, in 1934, was appointed assistant chief engineer. In the latter capacity, Burtch made many contributions to the design, manufacture and application of wire rope. From 1943 until his recent appointment, Burtch has been manager of sales for the aircord division.

* * *

HOBBS is a graduate of Western Maryland College and Johns Hopkins University, and has been a member of the Roebling engineering staff since 1934. He has designed and been instrumental in marketing several new wire rope products. Hobbs is well-qualified for his new position, for, apart from his engineering and research duties, he has long been interested in sales.

* * *

BOTH men have traveled extensively throughout the United States as Roebling consultants.

* * *

WM. HOBBS, JR.,
Manager of Sales Aircord Div.,
J. A. Roebling's Sons Co.

EXTRUDER TAKE-UP . . . . .

We have developed a new type of electrical driven take-up for use in connection with the insulation of small wires.

The speed of the take-up and the tension of the wire is controlled by the wire itself. We have several of these machines in continuous operation for over six months and they are working satisfactorily.

We can vary the speed from 75 to 1000 feet per minute and vary the tension so that we can run wires as small as 7-#35 strand with 10 mill wall. We can run reels as large as 30" diameter with a 14" traverse.

The unit consists of a motor, variable speed drive, outboard main shaft mounted on ball bearing pillow blocks, and an adjustable electrically operated traverse with necessary contactors to operate the motor and motor controls to vary the torque of the motor and the tension of the wire.

This unit is inexpensive in cost and we can make prompt delivery.

For further information write the

R. L. DAVIS ELECTRIC COMPANY

WALLINGFORD, CONNECTICUT

Cochran Added to Reynolds Wire Sales Staff

JOSEPH W. COCHRAN, III has joined the sales force of the **Reynolds Wire Company** of Dixon, Illinois, as Assistant to the General Manager of Sales. Mr. Cochran is a Williams College graduate and was a Captain in the U. S. Marine Corps. He has just recently returned to civilian life after four years' service, two years of which was with the First Marine Division at Guadalcanal and New Guinea.

* * *

Cleveland Crane and Engineering Changes Announced

HERBERT T. FLORENCE has been elected president and general manager of **The Cleveland Crane & Engineering Co.**, Wickliffe, Ohio. He has been general manager of the company since 1938 and vice president since 1941. **A. C. Garnett**, formerly secretary and treasurer was named vice president and treasurer. **W. G. Wehr**, was made secretary, and **W. D. Vanderbilt** assistant secretary.

* * *

THE Cleveland Crane & Engineering Co., manufacture large overhead traveling Cranes, Cleveland Tramrail overhead materials handling equipment and Steelweld bending presses, bulldozers and heavy metal-cutting shears.

* * *

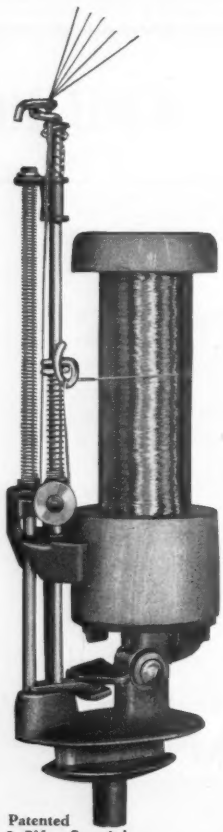
Anderson Placed in Charge of Operations for Youngstown Sheet and Tube

HARRY S. ANDERSON has been appointed assistant to the vice president in charge of operation for **Youngstown Sheet & Tube Co.**, Youngstown, Ohio, succeeding **Charles E. Oestman**, who has retired after thirty nine years in the steel business. Mr. Anderson, formerly manager of the claim department, is succeeded by **Herbert H. Hottel**, assistant manager of the department.

Heads Hydropress, Inc. Detroit Office

RONALD S. HIGGINS had joined **Hydropress, Inc.**, New York, builders of heavy hydraulic machinery and Rolling Mills, as Sales Representative and head of their Detroit Branch Office. Higgins, a Mechanical Engineer from Armour Institute of Technology, Chicago and Wayne University, Detroit served in the Naval Reserve in World War I. In World War II he was assigned to the Office of the Chief of Ordnance-Detroit, having the rank of Major. After successful practice as designer, engineer and superintendent of construction and operation, he entered the sales engineering field in 1924. For many years he represented such concerns as Pullman Car & Mfg. Co., Kennedy-Van Saun Engineering Co., Whiting Corporation, Darling Valve & Mfg. Company, Continental Roll & Steel Foundry Co., etc.

* * *



Patented
2 BX - Special
MOSSPEED Carrier.

MOSSPEED BRAIDER CARRIERS
FOR BRAIDING
MULTIPLE ENDS OF FINE WIRES

A special design MOSSPEED CARRIER and BOBBIN is supplied for braiding "SHIELDED" WIRE, ETC.

Will braid multiple ends of aluminum, brass, bronze or copper wire, etc.

SHEAVE-WHEEL on braider-stop and SPECIAL-THEADEYES on carrier, together with new type BOBBIN provides an even wire "let-off" resulting in a high quality and uniform braided shield.

Consult our engineers regarding your braiding problems

MOSSBERG
Pressed Steel Corp.

18 WEST STREET
ATTLEBORO, MASSACHUSETTS, U. S. A.

European Agent
James Day (Machinery), Ltd., "Ford House," 88 Regent Street, London, W. I., England.

G. E. Makes Changes

F. B. ENNIS, has been appointed manager of manufacturing of the **General Electric Co.'s Wiring Device Division,** Bridgeport, Conn. He came to General Electric in 1909 and was recently superintendent of the wiring device section. **J. R. Murray,** who has been with G.E. eleven years, and was formerly assistant superintendent of the wiring device section, has been made assistant manager of manufacturing of the Wiring Device Div. and superintendent of the wiring device section. **C. A. Devore,** former general foreman at the Mt. Vernon, N. Y. works, has been named manager of the works. **H. R. Geiman,** with G.E. since 1931 and former general foreman in the Meriden, Conn. works, is now manager of that plant. **E. G. Hopkins** becomes manager of the Norfolk, Connecticut works, where he formerly served as a foreman. **R. L. Priestley,** who was recently a foreman in Norfolk, is manager of the new Saugerties, N. Y. works. **W. A. Stott,** whose service record with the company dates from 1913, has been named manager of the Millerton, N. Y. works, where he was formerly a foreman, and **H. B. Turner,** who has been with the company since 1937, is manager of the Lowell, Mass. works, where he was formerly general foreman.

Full Automatic Conveyors

A NEW Bulletin No. FA-102 has been issued by the **Hanson-Van Winkle-Munning Co.,** of Matawan, N. J., on full automatic electroplating conveyors.

* * *

THIS bulletin describes all of the full line of conveyors made by the Company, including the Elevator type, the Munning type, the Straight Line type, and a variety of special plating machines such as caustic cleaning lines, tin plating lines, machines for plating wire, cable, zippers, etc.

* * *

THE bulletin is profusely illustrated with photographs and with phantom assembly drawings of the Elevator type and the Munning type conveyors.

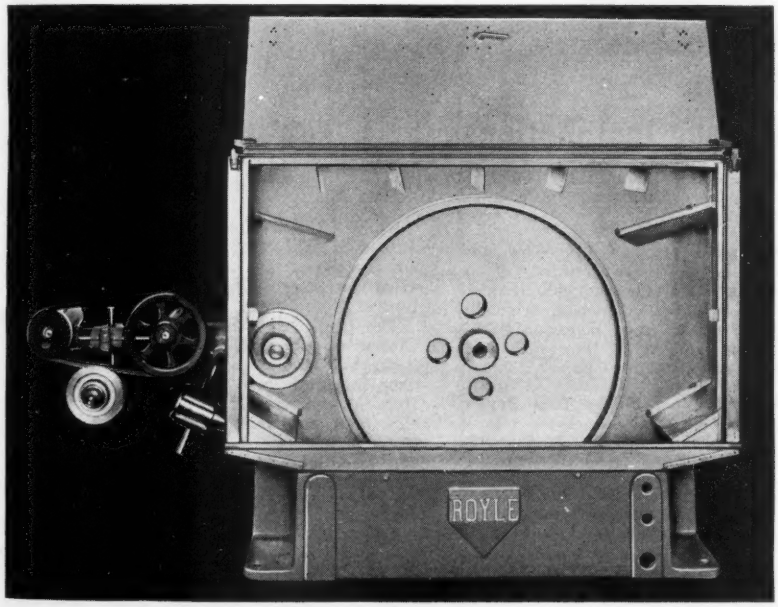
* * *

Aetna-Standard Engineering Co. Announces New Appointments

ACCORDING to a recent announcement of **The Aetna-Standard Engineering Company** of Youngstown, Ohio, **William Rodder** has been made Director of Engineering. Mr. Rodder has been in Aetna-Standard's engineering department for seventeen years, and for the past eight years has been Chief Engineer.

* * *

PERRY SNYDER succeeds Mr. Rodder as Chief Engineer. Mr. Snyder was formerly with the Youngstown Sheet & Tube Company, and until recently was Division Engineer at the Brier Hill Works of that concern. His office will be located at Aetna-Standard's headquarters, Home Savings & Loan Building, Youngstown, Ohio.



The Royle 36" High Speed Capstan for Resin Insulated Wire

- Stainless steel watertight enclosure
- Total enclosure permits higher wire speeds
- More efficient wire puller stabilizes wire speed
- Secondary idler pulleys guide wire across capstan preventing rubbing and permitting larger quantities to be cooled simultaneously
- All bearing located outside of enclosure to prevent contact with water
- Quiet running
- Built-in air wiper

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

James Day (Machinery) Ltd. London, England REgent 2430

Home Office B. H. Davis J. W. VanRiper SHerwood 2-8262

Akron, Ohio J. C. Clinefelter UNiversity 3726

Los Angeles, Cal. H. M. Royal, Inc. Lafayette 2161

PATERSON 3, NEW JERSEY

A Review of Recent Wire Patents

No. 2,403,075, MACHINE FOR PRODUCING SCREW THREADS, patented July 2, 1946 by Arthur Green, Coventry, England.

This may also be employed as an attachment for existing machines and includes a pair of parallel flexible bands, seamed at one of their ends to the tool support and engaged by the periphery of a disc which winds up and then unwinds one band after the other.

* * *

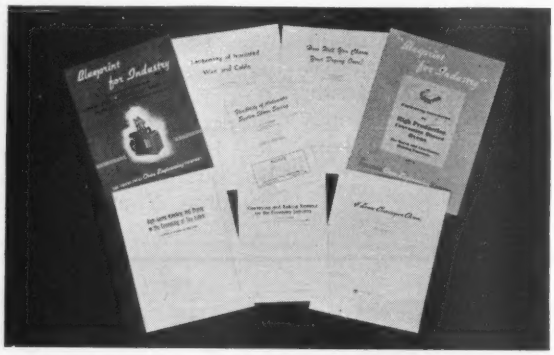
No. 2,403,359, SCREW, patented July 2, 1946 by Alfred Gerhold, Westcliff-on Sea, England.

The screw is provided with a sharp-pointed nose having a single straight groove of arcuate section which is obliquely inclined in relation to the screw shank with this disposed to form a radial and undercut cutting face the undercut of which affords a rake to a cutting edge of the face, the raked cutting edge extending to the point of the nose and acting to cut away material when driving in the screw by rotation.

* * *

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States anad Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

OVEN ENGINEERING NEWS



Write for These Technical Bulletins on Oven Engineering Installations

The battle of costs is a battle that never ends. Present day problems dictate the policy of constantly surveying your existing facilities for materials-handling as well as your oven-processing systems, in order to keep your manufacturing costs at a profitable level.

The Industrial Oven Engineering Company designs, engineers, manufactures and installs complete materials-handling and oven-processing systems for many different industries.

These installations are described in the pamphlets listed below. They are well illustrated with photographs and drawings. A good many of these installations are probably applicable with slight variation, to your own processing problems.

These pamphlets are free. They are briefly described below. Check off the ones you want and drop us a line.

☐ **Blueprint for Industry, Part III**— Complete engineering information on our constant-speed, constant-tension windup machine for wire, cable, textile, tape, coated fabrics and other continuous materials, the only machine of its kind on the market.

☐ **Lacquering of Insulated Wire and Cable**— A 16-page reprint of a thorough going article on cable lacquering techniques and equipment, originally published in the trade magazine "Wire and Wire Products". Illustrated with drawings.

☐ **How Will You Choose Your Drying Oven?**— A description of the role of the infra-red lamp in modern drying ovens.

☐ **Blueprint for Industry, Part II**— A comprehensive 18-page brochure on high-production ovens for many batch and continuous heating processes. In addition to detailed descriptions and engineering details of many efficient oven-materials-handling systems, it contains two pages of engineering data on gases and other materials, along with fan engineering data.

IOE ENGINEERING VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

13825 TRISKETT ROAD, CLEVELAND 11, OHIO

* ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND *

No. 2,403,426, METAL COATING PROCESS, patented July 2, 1946 by Alfred Douty, Elkins Park, and Gerald C. Romig, Melrose Park, Pa., assignors to American Chemical Paint Company, Ambler, Pa., a corporation of Delaware.

In finishing ferrous metal surfaces, these inventors treat the surfaces with an aqueous solution of both primary and secondary phosphates consisting of alkali metals and ammonium, the pH of which lies between 4.7 and 6.5 and is greater than that corresponding to the monobasic phosphate present alone and lower than that corresponding to the dibasic phosphate present alone, rinse the surface so treated with a dilute aqueous solution containing chromic acid having a pH in the range 2.0 to 4.6 inclusive, and containing no more soluble salt than corresponds to the metal equivalent of 30 oz. of sodium dihydrogen phosphate per 100 gallons, dry the rinsed surface and then apply a siccative finishing coat to the dry surface.

* * *

No. 2,403,706, METALLIC COATING, patented July 9, 1946 by Eugene E. Bryant, Bedford, Ohio, assignor by mesgne assignments, to the United States of America, as represented by the Secretary of War.

To a metal base, this patent teaches the steps of applying thereto a mixture in water of this flux, a major proportion of at least one oxide of a metal of the group consisting of nickel, cobalt and chromium, and a minor proportion of at least one oxide of a metal of the group consisting of zinc, tin and lead, the particles of this mixture being of such fineness that all will pass through a sieve having 200 meshes to the square inch, then firing the coated metal in a closed system, containing a reducing gas. It is claimed a thin, even film is provided, firmly adhering to the surface.

* * *

No. 2,403,783, COATED NAIL, patented July 9, 1946 by Willis E. Boak, Burton, Ohio, assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

The coating consists of about 86 parts Cumar of CX grade, 155 parts gilsonite, 2 to 8 parts plasticizing oil, 125 parts asbestine and 75 to 90 parts red oxide of iron. As the nail is driven into the wood, the heat melts the coating, in part, and the melted material fills irregularities in the wood and tends to bond the nail to the wood.

* * *

No. 2,404,129, ELECTRICAL WINDING, patented July 16, 1946 by Martin Flatland, San Francisco, Calif.

In winding a magnetic field core, a number of wire are assembled in compact cable formation, and end thereof is reeved between and around the core and the ends of the wires joined to form a continuous wire between its free ends.

* * *

No. 2,404,424, MACHINE FOR COILING METAL STOCK, patented July 23, 1946 by John Bala, Sr., Schenectady, N. Y.

This machine is said to be especially

adapted to coil springs and form spring lock washers. There are 15 claims.

★ ★ ★

No. 2,404,883, SPRING CONSTRUCTION, patented July 30, 1946 by Andrew Mouw, Huntington Woods, Mich., assignor to No-Sag Spring Company, Detroit, Mich., a corporation of Michigan.

More specifically, the invention pertains to attaching means for the ends of zigzag spring strips, such as disclosed in U. S. Reissue 21,263 of Nov. 14, 1939.

★ ★ ★

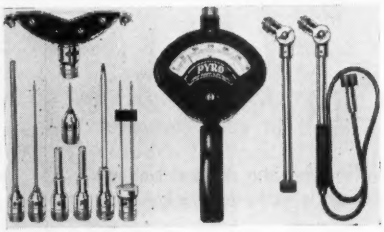
No. 2,405,057, MAKING INSULATED WIRE, patented July 30, 1946 by Aaron Rosenstein, New York, and Harry Dolan, Brooklyn, N. Y., assignors to Rosenstein Bros., New York, N. Y., a firm composed of Aaron Rosenstein, Charles Rosenstein, and Irving J. Fuller, partners.

The method comprises continuously extruding and insulating material and winding it upon a conduction metal core, baking the insulating winding, continuously extruding a non-elastic artificial thread and winding it upon the insulating layer, and then water proofing the artificial thread covering.

★ ★ ★

The New PYRO Surface Pyrometer

THE PYRO Surface Pyrometer has been designed especially to meet the vast and ever-increasing necessities for precision accuracy with plant and laboratory require-



Pyro Surface Pyrometer

ments for dependability, durability and ease of operation. It is completely self-contained, portable, compact, and quick acting. Constructed in a shock, moisture and dust-proofed shielded steel housing it is immune to external magnetic influences and the large 4¾″ diameter indicator with a 4″ direct reading scale offers the greatest ease yet in reading temperatures quickly and accurately. An internal automatic cold end junction compensator is standard equipment with this instrument thus further insuring highest precision accuracy. A choice of eight different thermocouples and two types of extension arms, all instantly interchangeable without adjustment or re-calibration, together with a selection of five different temperature ranges from 0-300° F to 0-1200° F makes this instrument ideally suited for any metallic or non-metallic surface temperature problem. The interchangeable thermocouples also have been designed to eliminate temperature gradient errors and all thermocouple wires have been carefully selected and checked to ∓ 2 degrees Fahrenheit accuracy. A copy of the illustrated catalog No. 160 will be sent upon request. Please write The Pyrometer Instrument Co., 103 Lafayette St., New York 13, N. Y.

TO WIRE MILL MEN

Have you considered joining the Wire Association? You are cordially invited to become a member. Dues are $15.00 a year, which includes a subscription to WIRE & WIRE PRODUCTS and a copy of the Annual Buyers Guide.

THE WIRE ASSOCIATION

300 Main Street,
Stamford, Conn.

NOTICE TO SUSCRIBERS

regarding the

WIRE & WIRE PRODUCTS BUYERS GUIDE AND YEAR-BOOK OF THE WIRE ASSOCIATION

The 1946 Edition of this useful directory may be obtained by subscribers at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

Members of The WIRE ASSOCIATION will continue to receive a copy of the BUYERS GUIDE as part of the service extended to them, and the cost is included in the dues.

TO ALL OTHERS THE PRICE REMAINS AS HERETOFORE $5.00 PER COPY.

THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in this country, together with listings of all machinery, equipment, supplies and services used by the Wire Industry.

It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in the Spring annually. . . . Only $3.00 to subscribers.

WIRE and WIRE PRODUCTS

300 MAIN STREET **STAMFORD, CONN.**

Corkscrews

(*Continued from page 675*)

ciency resulted with corkscrews long enough to penetrate clear through the cork and furnish lifting surface below it.

* * *

THE report indicates that a leverage device of some kind is essential for corkscrews intended for use in opening wine bottles. Among devices recommended following the Institute tests were those using the lazy-tongs principle, a nut which turns around the screw shaft, twin levers pressed down by both hands, and the folding jackknife or boot-lever type. None of these requires continued turning of the screw while drawing the cork, a practice the researchers found inadvisable in that it tended to drill the center out of the cork.

* * *

THE hinged boot-lever type, popular with waiters, revealed disadvantages which may be corrected in future manufacture. The pull applied by the leverage is not at all stages directly upward. If the screw shaft is not sufficiently strong, it may bend. Also, some "boots" were too long to permit full penetration of the cork before the beginning of the pull. Modification of the boot, lengthening of the worm, and the suspension of the worm at a carefully determined point on the handle were recommended by the researchers to permit both full penetration in all corks and a more direct pull.

Finding a corkscrew's pulling power through use of a Scott inclination balance testing machine at Smith, Emory & Co. laboratory, San Francisco. Corkscrew, inserted into cork which has been cemented into wine bottle, is gripped near top while bottle is pulled downward by machine. Dial registers force required to pull cork off corkscrew. Here the reading is almost 33 pounds.

* * *

Wire Drawing Machines — Past, Present and Future

(*Continued from page 678*)

first operation is cleaning in either hydrochloric or hot sulphuric acid. In England it is not the usual practice to automatically control the strength of the acid, the specific gravity being left to the discretion of the cleaner. We have no chemists constantly taking sample analysis and continually maintaining the strength. Every hook or ton of

YOU ARE INVITED TO JOIN . . . . . .

THE WIRE ASSOCIATION

To those wire mill men who have not already joined the Wire Association for the mutual benefit of those engaged in the operating end of the Wire Industry, a cordial invitation is extended to become a member.

If you are making rods and wire—of steel, copper, brass, alloy or any ferrous or non-ferrous metal, or are in the wire products end—nails, bolts, screws, rivets, wire rope, wire cloth, springs, electric wire and cable or any of the numerous products made of wire, you will benefit by identifying yourself with the Association.

The Wire Association is a non-profit organization of wire and wire products mill superintendents, executives and foremen, whose specific purpose is to improve production methods and afford a clearing house for ideas on management, technical and research problems, and to develop and maintain friendly relations among members.

Dues, including a subscription to WIRE AND WIRE PRODUCTS, a copy of the BUYERS GUIDE and the various services to members, $15.00 per year. Please write today for a membership application card.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

300 MAIN STREET STAMFORD, CONN.

wire cleaned has some effect on the acid and consequently the time of cleaning cannot be constant. There is a specific time for the cleaning of every coil in direct relation to acid strength and we have to rely on the experience of the cleaners. We are afraid that our acid may attack the rod itself and as a safeguard we add an inhibitor in the hope that the acid will just loosen the scale and clean the rods sufficiently for our requirements without damaging the wire.

* * *

NO expert examination is given to the rod to see if the acid has attacked the steel. We rely on the restraining effect of the inhibitor, probably remembering that later on in the processing we have a lime bath to neutralise any bad effects of the acid. After cleaning we swill the coils under pressure and hope sufficient dilute acid has been left on to form a good ferrous oxide coat. No experienced technician or chemist decides the correct coat which is going to influence greatly our speed of drawing. We neutralise in a lime bath which may or may not be sufficiently agitated. Finally, we attempt to drive off, in a few minutes, any occluded hydrogen which may be present. In the old days, we used to make certain that we had properly baked rods by baking the coils overnight. They may be drawn immediately or they may have to stand a few hours absorbing moisture. The wire is then expected to be drawn at a speed which may be three or four times as great as that in use a few years ago. I am afraid we will have to control the cleaning and coating preparations more effectively before we assume that much higher speeds can be satisfactorily carried out.

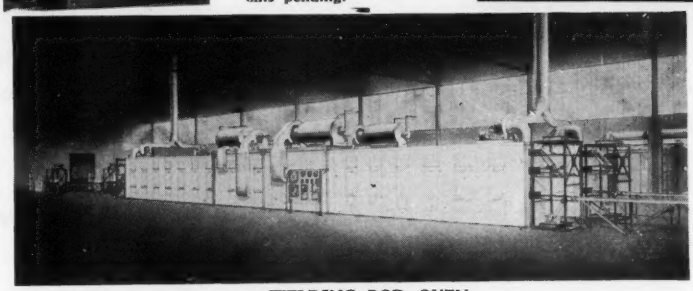
* * *

THE manufacturer must introduce new methods of coating and preparation. Lubricants must be thoroughly investigated. A more scientific study of die profiles and maintenance is necessary. The wire machinery maker and the wire manufacturer must co-operate more and more and study the problems involved. In this matter of speed of production one is dependent on the other and no machine designed for

MORE PRODUCTION
IN LESS TIME with
CARL-MAYER
FURNACES, OVENS

CARL-MAYER HI-SPEED
ROD BAKER

The fastest rod baker built! Saves up to 50% in time and fuel. Patented Blow-Off Feature removes moisture without bumping or agitating the coils. Patented and patents pending.



WELDING ROD OVEN

For drying coated welding rods. Uses the "Mayer" Recirculating Gas Fired Air Heater principle and Rod Transfer Systems (patents pending).

Growing interest in our type of equipment is evidenced by Carl-Mayer installations in such plants as: —

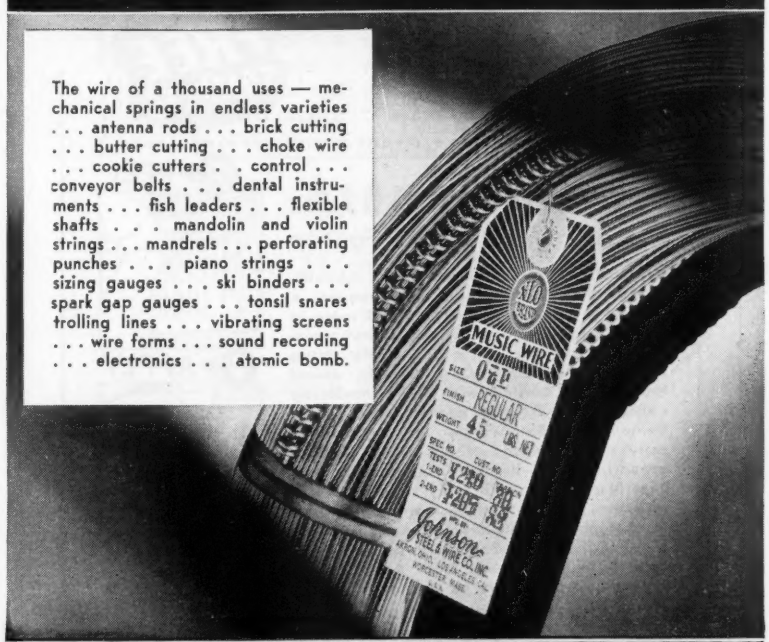
Atlantic Wire Co.
Atlas Tack Corp.
Atlas Steel Co.
Eaton Mfg. Co.
Hollup Corp.
Johnson & Nephew Ltd.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Steel Co. of Canada
Wickwire Spencer Steel Co.

WRITE for BULLETIN No 241

THE CARL-MAYER CORPORATION
3030 EUCLID AVENUE
CLEVELAND, OHIO

JOHNSON

The wire of a thousand uses — mechanical springs in endless varieties . . . antenna rods . . . brick cutting . . . butter cutting . . . choke wire . . . cookie cutters . . control . . . conveyor belts . . . dental instruments . . . fish leaders . . . flexible shafts . . . mandolin and violin strings . . . mandrels . . . perforating punches . . . piano strings . . . sizing gauges . . . ski binders . . . spark gap gauges . . . tonsil snares trolling lines . . . vibrating screens . . . wire forms . . . sound recording . . . electronics . . . atomic bomb.



JOHNSON STEEL & WIRE CO., INC.
WORCESTER 1, MASSACHUSETTS.
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

STANDARD & SPECIAL

TUNGSTEN — CARBIDE DIES

COLD HEADING and EXTRUSION DIES

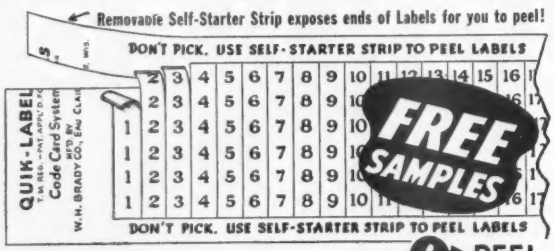
Wire Drawing Dies — Tubing Dies — Coating Dies — Sizing Dies —Ring Gauges — Cut-off Quills. Also Manufacturers of Diamond Dies & Diamond Powder.

For Immediate Delivery on Standard Boltmaker & Extrusion Dies, Wire Drawing & Tubing Dies, Address Inquiries to: —

MICHIGAN WIRE DIE COMPANY

11152 CHALMERS AVE. DETROIT 5, MICHIGAN

Phone: Pingree 5702

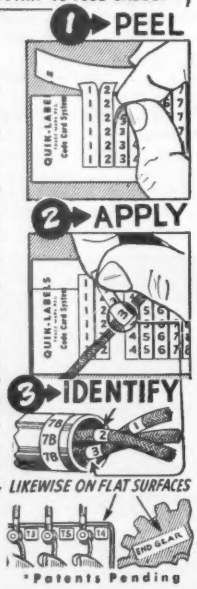

Removable Self-Starter Strip exposes ends of Labels for you to peel!
DON'T PICK. USE SELF-STARTER STRIP TO PEEL LABELS
QUIK-LABEL
Code Card System
FREE SAMPLES
DON'T PICK. USE SELF-STARTER STRIP TO PEEL LABELS

QUIK-LABELS

Mark your wires Faster

QUIK-LABELS code Wires, Leads, Circuits, Relays, Parts, etc. faster and cheaper. • *Pre-cut* to exact size, QUIK-LABELS come in rows on handy Cards, stick without moistening. • Replace slow and costly string tags, roll tapes, decals, stencils, metal tabs, etc. • Coated with clear insulating varnish to resist dirt, grease, abrasion. • Removable *Self-Starter Strip automatically exposes ends of Labels for you to grasp instantly—no more finger-picking. • Cost less to buy-and-apply than all other markers. • Maintenance men carry Cards to the job. • QUIK-LABEL Bench Dispenser holds Cards for production operators to code with both hands free. • 275 NEMA Markings and Colors in stock.

Write for Folder and FREE Sample Cards.



W. H. BRADY COMPANY

Manufacturers of Self-Sticking Tape Products

Established 1914

Century Bldg., Milwaukee 3, Wisconsin

Factory: Chippewa Falls, Wisconsin

*Patents Pending

high speed production should be condemned because the quality of the product is inferior. It is simply that we have not, at this stage, sufficient knowledge and experience to work efficiently at excessively high speeds.

* * *

THE tungsten carbide die is the king pin of the machine. It can be ruined by bad lubrication, by bad maintenance, by acid on the wire, by wet soap, by bad coatings and many other factors. Providing adequate attention and control is paid to wire preparations, there is no limit to the speed of drawing but I maintain that excessively high speeds cannot be expected consistently under present conditions. Attention should be given to statements made by our scientists to the effect that graphite is the best lubricant known. In other countries they are paying special attention to coatings and we must not think that we have reached finality by any means.

* * *

IN 1937 it was my privilege to inspect many wire drawing factories in America and Canada, a visit extending over three months. Many opportunities were given freely and without reservation, to study their methods of production and one has only to attend their periodical Wire Conventions to appreciate the enthusiasm they have for their work. We have much to learn from them regarding factory lay-outs and general organization.

* * *

THEIR types of machinery could be divided into two or three groups. Some factories believed in obtaining maximum outputs from single hole blocks, cutting handling times to the minimum by installing runways and efficient electrical lifting appartus. Single holing wire at high speeds could produce outputs which made one wonder why multiple draft machines are necessary. One operator took charge of six single blocks, his main job being to see they were kept in production continuously, the input rods and finished wire being handled by unskilled labour. The direct current enthusiasts had the straight line

Vaughan type machinery, the alternating current school having the **Morgan Connor** multiple holers. My one regret was that I never discovered a factory drawing wire at speeds much higher than ours, except perhaps in copper wire production. It was evident, however, that their metallurgists and technicians were conducting research work on such a scale that in a few years, existing methods would be considered obsolete Much research was being undertaken on coating, cleaning, liming and blueing

* * *

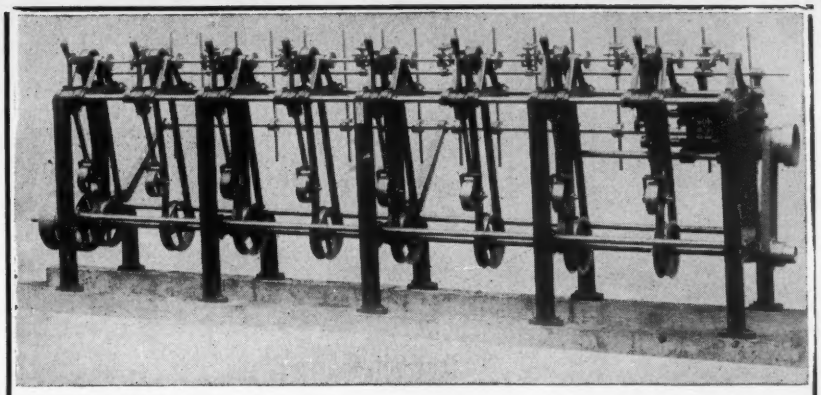
LATER in 1938 and 1939 opportunities came to visit works in Sweden, Hungary and Rumania. Methods of producing wire are similar the world over but the human element is entirely different. In Canada I had seen a single operator working fifty blocks without assistance, in Germany one operator six-nine holers and in Hungary one girl working ten-nine hole machines. Quite a difference to our production methods, but it shows that if we have to export in order to live we will have to think much harder than formerly in order to compete with foreign markets.

* * *

LET us now consider the future wiredrawing machinery. The machine manufacturer has, in the past, invented a particular design, made a prototype and wasted many valuable months getting the new design on the way. English firms like to know if the other fellow has installed the first machine and with what results. If the first efforts are not too successful, due to experimenting and perhaps testing troubles a couple of years may pass before the design is accepted. The result is a machinery maker, once he has popularised a particular model, is reluctant to change his design except in details. The system is wrong inasmuch as the wire manufacturer should be the person who knows exactly what he wants and should seek the co-operation of the machinery maker to achieve the object.

* * *

TO take an example. Suppose a wire factory produces straight lengths of a certain size and length



No. 1900E SPOOLER

WIRE SPOOLING MACHINES

Model illustrated takes spools up to 12" diameter. Floor space required: 19" x 10'; length can be varied to suit largest spool specified. Handles wire up to .050" diameter. Other models made to suit specific requirements.

EMORY SPOOLERS are built for years of continuous service. Precision made, durable, rugged, dependable.

BUILDERS OF WIRE SPOOLING MACHINERY for A HALF CENTURY

For details, write to

ROBERT J. EMORY COMPANY
NEWARK 5, N. J.
31 East Runyon Street
Telephone Bigelow 3-4415

THE WIRE ASSOCIATION

1946 CONVENTION

Will Be Held at

HOTEL STATLER, BUFFALO, N. Y.

October 21 — 24, inclusive, 1946

* * *

Tentative program is published in this issue of WIRE & WIRE PRODUCTS.

Technical papers will be preprinted in the October issue of WIRE & WIRE PRODUCTS.

For information and hotel reservations write

RICHARD E. BROWN, Executive Secretary

THE WIRE ASSOCIATION

300 MAIN STREET STAMFORD, CONN.

For Machine Lapping
Cemented Carbide Dies
Use NORBIDE* Abrasive

NORBIDE Abrasive is successfully used for the machine lapping of cemented carbide wire drawing dies — both on new dies and for refinishing. The hardest material made commercially, NORBIDE Abrasive is extremely efficient for lapping and 100 times less costly than diamond dust.

NORTON COMPANY
Worcester 6, Massachusetts

* Reg. U. S. Pat. Off.

"Standard" ROLLING MILLS

for HIGH PRODUCTION RATES

"Standard" Rolling Mills assure high production hot or cold rolling of your strip, rod or ingot. Speeds are provided for rolling metals in any range from 10 feet to 500 feet per minute, depending upon your needs. Two, Three, or Four High Mills are available with roll sizes from 1½" diameter and 1" face to 16½" diameter and 18" face.

"Standard" manufactures special units for grading, cross and pinch rolling, forming wire to exact dimensions, and for a large variety of shaping operations.

Catalog section RM and detailed recommendations will be sent upon request.

STANDARD MACHINERY COMPANY
1545 Elmwood Ave., Providence 7, R. I.

in large quantities and the manager wants to cheapen production, saving handling, space, scrap and labour. We could design a combination machine, part wire drawing and part straightening. The Rod would enter at the front end and straight lengths would be produced at the finishing end all by a single operator. If, on the other hand, we were to design a machine combining the two operations, we would have to discuss, sell the idea, advertise and probably make a machine on approval. The same principle could be introduced in the manufacture of nails, screws, springs, wire accessories and many other applications. We may even fit low speed drawing blocks in front of galvanizing plants producing the one holed wire, galvanized from the rod, to save handling operations when producing fencing wires and similar one hole productions.

* * *

WE could design wiredrawing machines which combine several operations. In fact, we are in the near future, placing on the market a combination of the GM and TF machines, a combined non slip and slip machine for special purposes and from the test figures to hand I can state that we save 30% in horsepower when drawing copper wire by this method.

* * *

WITH the co-operation of the industry we could introduce spooling directly from the finishing block. This would be valuable in cases where further procesing, such as galvanizing or patenting was required. Speeds of production will be advanced as soon as the preparation technique is improved. Machines in the near future will, no doubt, be nicely streamlined, without projections and as automatic as possible. We can make the machines close down automatically once the desired weight of coil has been drawn and with a little ingenuity could make the coil strip itself withouth handling by the operator.

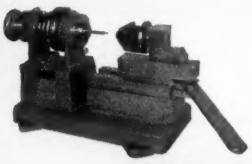
* * *

ALL these, however, are simply innovations to the designer and gadgets to the producer. Future machinery will, in ten or fifteen years,

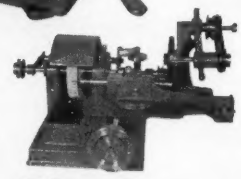
NEW DIE ROOM FINISHING *MACHINERY*

DIE ROOM TOOLS and EQUIPMENT

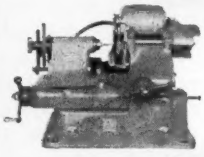
For speeding up production of Tungsten Carbide Dies and making lapping pins faster and with regular die room help. No special skill required.



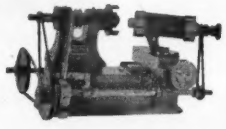
NEW DYRO PIN MAKER



NEW ROOS PIN GRINDER



NEW PARK PIN GRINDER



ROOS PRECISION GRINDER

All sizes LAPPING PINS
Prompt shipment on orders of 1 to 1,000.

And New PIN GAUGE
for fast checking pin sizes.
Write for details.

SEND FOR NEW CATALOGUE DESCRIBING LATEST ROOS EQUIPMENT FOR WIRE DIE FINISHING MACHINERY

ROOS TOOL & MFG. COMPANY
Plant and Shipping Point
17 Grove Street, Montclair, N. J.
Sales Office
49 Bloomfield Avenue, Newark 4, N. J.

be as unlike today's models as today's are unlike those of twenty years previously. We have hopes of producing a synthetic which is almost unwearable with certain coatings and lubricants. In the near future, we will have on the market, a machine drawing from block to block direct, without control by swinging arms and guide pulleys. The amount of back tension can be controlled as required and the wire allowed to rest between reductions. This should be a big advancement in the design but it still has to go through all the processes of introduction before it can become one of the members of the family.

* * *

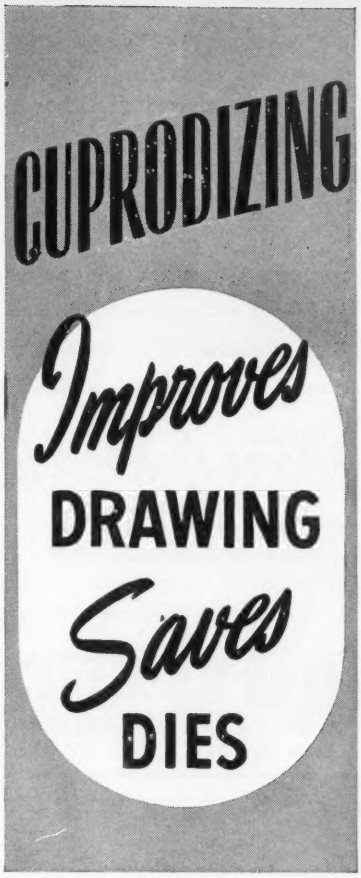
LET us examine the more distant future. Steel wire products have been used for hundreds of years but they have always suffered from deterioration, fortunately for the manufacturer and unfortunately for the consumer. Oxidation of the product has always been a disadvantage. To my mind, there is a distinct possibility of the alloys making great progress and with the experience gained during the past few years, alloys possessing the same specifications as steel but without the faults are posible. When methods of production of alloys are developed they will undoubtedly be a formidable rival to steel.

* * *

THE reasons why we should be on the look-out continually for revolutionary methods are closely connected with the non ferrous and alloy trades. Take an alloy tube for example. It is 2¼″ outside diameter and 1¾″ inside diameter. We have made many machines during the past eight years, which enable it to be reduced in one operation to 1″ outside diameter and ⅞″ inside diameter. What can now be accomplished on tubes of brass, bronze, stainless steel and many other alloys will be accomplished on solid sections within a few years. The whole operation is by cold rolling on a specially designed machine. Ten years ago it could only be done by drawing through about ten operations on draw benches.

* * *

NOW take the case of the continuous swaging machine. The original diameter of a steel rod may



Grades of CUPRODINE for coating Stainless as well as Carbon Steels, without current, are now available.

The CUPRODINE non-electric process produces dense, adherent copper coatings that improve the drawing properties and increase die life.

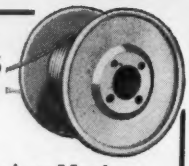
CUPRODIZING is rapid and economical—well known in the wire industry for its ability to increase production.

CUPROTEK—The protective effect of copper coatings is greatly improved by treating them with CUPROTEK and should be used to protect copper, copper alloys, copper coatings and copper-tin coatings if work is to be stored, shipped or held during fabrication.

For further information, address our Technical Dept. D-9.

American Chemical Paint Co.
AMBLER ACP PENNA.

APCO MOSSBERG STEEL REELS & SPOOLS



Standard Equipment for Higher Winding Speeds

Apco Mossberg Steel Reels are standard throughout the wire industry – and for good reason! Apco Mossberg – the original Frank Mossberg Co. – *originated* the steel reel idea and have been training workmen in their manufacture ever since. That is why Apco Mossberg Steel Reels are preferred where production schedules are heaviest.

FREE ENGINEERING SERVICE
We will gladly submit drawings, blueprints, or suggestions without obligation to you. Write for quotation today.

APCO MOSSBERG CO.
(The Original Frank Mossberg Co.)
21 Lamb Street . . . Attleboro, Mass.

Canadian Representative:
HUGH WILLIAMS & CO.
79 Wellington St. West
Toronto, Ontario

Wire Geared to Today's Production

Let Continental wire help you cut production costs, and add to the utility and appearance of your product. Available in a wide range of sizes, shapes, analyses and finishes.

CONTINENTAL STEEL CORPORATION ★ SUPERIOR STEEL WIRE

CONTINENTAL SUPERIOR STEEL

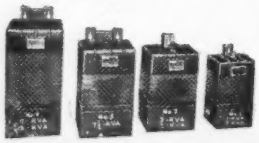
CONTINENTAL STEEL CORPORATION
GENERAL OFFICES – KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, ROBERTS, Piano-Sealed, Copperoid, Tinned, Annealed, Upper Finished, Bright, Lead Coated, and special zinc. ALSO, Coated and Uncoated Steel Sheets, Flats, Continuous Chain Link Fence, and other products.

WIRE CUTTING and SHAPING MACHINES, FINE WIRE WELDERS
We make Spot Welders from 1/4 to 500 KVA & all Types Butt Welders

Automatic Drawing and Cutting Mach.

TRANSFORMERS in sizes from ¼ to 300 KVA in the following types: furnace distribution, lighting, power, auto, phase changing, air, oil, induction, water cooled and special.



Bench Type Butt Welder

Spot Welder

CHARLES EISLER

EISLER ENGINEERING CO., Newark 3, N. J.
747 So. 13th St., near Avon Ave.

LEWIS TRAVEL-CUT WIRE STRAIGHTENING and CUTTING Machines

Machines for 1/16" to 3/4" rod
Round
Square
Flat
Hexagon
Ferrous and Non-Ferrous

Automatic
High Speed
Heavy Duty

The Sign of Dependable Service:
WE CAN SUPPLY AND ENGINEER OUR TOOLS EQUIPPED WITH CARBOLOY CEMENTED CARBIDE

The LEWIS MACHINE Co., 3445 E. 76 St., Cleveland, O.

be ½". In one operation it can be reduced to 5/16" diameter or finer, by swaging and can be done continuously. This method is at present used in producing tungsten wire and if developed may lead to decreased production costs.

* * *

WHEN you consider fine wire production, it seems montrous that we should have to have a machine such as the present day fine wire machine to draw a single strand of wire onto a bobbin or block and call it production. The whole system seems wrong and I do not expect we will have the same processes in the future. Some enterprising engineer or inventor will come along with an alloy having all the properties of steel and extrude it perhaps through a hundred orifices simultaneously, in lengths to meet our requirements.

* * *

IT may be that we will discover the cold drawing of wire is not the ideal solution. Successful experiments have been made in hot drawing of copper wire and personally I cannot see why steel should not be more ductile when hot. It certainly would flow better.

* * *

MY belief is that we, in the wire trade, are really burying our heads in the sand. We should learn more from other trades. Surely, the methods employed in producing glass fibre, for instance, can be of assistance and the methods of producing nylon should give us food for serious thought.

* * *

WHAT we need in this country is a research group continually studying the enumerable problems connected with the industry. We need more and more qualified technicians both in the wire manufacturing business and the machine makers. More co-operation between the two sides should be possible since, after all, their interests are mutual. Most of us are too busy doing a variety of jobs with no time to think too seriously of the distant future. Employers are too busy setting their works in order to wonder what the future will hold.

WE must, with our present knowledge, improve past efforts. Many things in use at the moment can be revised. Take the standard wire gauge for example.The whole arrangement is out of step with modern practice. We have the Imperial Standard Wire Gauge, the Birmingham Wire Gauge, the Paris Gauge, Pinion Wire Gauge, Brown & Sharp's Gauge, Stitching Wire Gauge, Card & Heald Wire Gauge, Music Wire Gauge and many others. They are all different and yet we are expected to manufacture wiredrawing machinery which will cover the whole range. We must standardise these differences in order that the wire machinery manufacturer can design machines to the best advantage.

* * *

WE have now completed our brief survey of wiredrawing machinery used in the inmmediate past, types available at the moment and probably designs of the immediate future. The distant future we can only surmise. Wiredrawing, as we now know it, may change fundamentally. We will, in all probability, cease to draw wire through a die, almost breaking it at every stage of reduction. It is very interesting to realise that by elongating the wire, we must inevitably create a fracture but if 90% of the breaking force is used to draw it through a die the wire can undergo the same operation time after time, until overdrawn. We can take ¼" copper rod and by successively drawing it through dies in small stages obtain a long length only 2/1000 of an inch diameter and 82,000 times its original length, without intermediate annealing, at a rate of over a mile per minute. Wire, however, is only as good as we can make it. Sooner or later we will find methods of pushing the wire through the die, instead of pulling it through. One can visualise plants which extrude many wires simultaneously at exceedingly high speeds. We may improve rolling technique and continuously reduce the wires by external pressure. It is not beyond the realms of possibility that we will eliminate the die altogether and find other means of elongating the wire. Developments of back tension may help this considerably.

"STEELSKIN PRODUCTS"

MAY SOLVE YOUR WIRE DRAWING AND CLEANING PROBLEMS AND REDUCE YOUR COSTS

Specialty Products for Lubrication And Cleaning of All Types of Wire

MFG. BY

R. H. MILLER CO., INC.

HOMER, NEW YORK

Established 1909

WE BUY!
WE SELL!

USED WIRE MACHINERY • ALL KINDS

Have you any kind of machines to dispose of? We'll buy them — all types! Write for our price! Prompt attention given to inquiries.

WIRE & TEXTILE MACHINERY INC.

P. O. BOX 104 — PAWTUCKET, R. I.

STEEL WIRE

by MAURICE BONZEL

* * *

Translated and Published by

Kenneth B. Lewis

Consulting Engineer

* * *

Price $15.00

* * *

495 pages—414 illustrations

* * *

SEND ORDERS TO

WIRE and WIRE PRODUCTS

300 Main St., Stamford, Conn.

H-12 WIRE ENAMELING MACHINE NO. 885

Electric Heated Oven (Single Sided) Take-up is Horizontal With Dual Spindless For Large or Small Reels.

One of Our Full Line of Machines

"American" INSULATING MACHINERY COMPANY

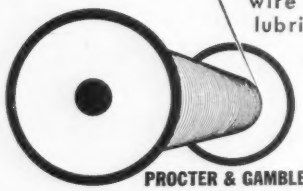
517 West Huntingdon St., Philadelphia 33, Pennsylvania, U. S. A.

FOR MAXIMUM "MILEAGE" AND FINISH CONTROL IN YOUR WIRE DRAWING OPERATIONS USE P&G SOAPS

For drawing both ferrous and alloy wires—in either dry or wet operations — you can depend upon these important qualities in Procter & Gamble soaps:

Excellent Adherence
Efficient Lubrication
Minimum Dusting
Uniformity
Economy

One of our representatives will be glad to discuss wire drawing lubricants with you.



PROCTER & GAMBLE, CINCINNATI

WIRE CUTTING MADE EASY

Hard wire*, spring wire, as well as soft wire, wire fabric, tie wire, fencing, etc. — easily and quickly cut with a porter tool. A standard model for average needs. Special models for special work.

Send for catalog showing all Porter models of wire cutters, bolt clippers, etc.

(with center cut round edge jaws)

H. K. PORTER, INC.
EVERETT 49, MASS., U.S.A.

PORTER HKP CUTTERS

MANY articles that we asume must be made of wire, such as window guards, machine guards, baskets, brushes, fences, binding wire, etc., will have to meet the competition of plastics in the future. We should continually be on our guard inventing and testing new ideas. The wiredrawing machinery of the future is what we make it and if, in the years to come, we are allowed to develop iniciative and enterprise, we should have no cause for alarm. The danger lies in assuming that what has been established for hundreds of years must necessarily continue to be so.

* * *

LET us therefore improve our knowledge of the Industry. Let us look on metallurgists, scientists, chemists and anybody occupied in research work in a different light. They can help us considerably and their efforts should be encouraged. Only by constantly keeping in touch with day to day scientific knowledge can we in the Wire Industry keep abreast or ahead of the times.

* * *

TO my mind, the wire drawing machine has been evolved to suit a particular set of circumstances. The manufacturer can help the designer considerably and vice versa.

* * *

LET us get together more schools of thought. Let us have more theoretical knowledge of the subject. The more we learn, the more we realise how little we know and how much we have to learn. If we could only pass on our experiences to the youngsters coming along, they would be much better equipped to face the future.

* * *

THAT is why I feel the Staff School is doing a grand job, pioneering and encouraging its members to understand the problems of the Industry. Such efforts entail much thought and self sacrifice on the part of its administrators. Every contribution, however small in the way of knowledge, helps it on its way and I am glad to have had this opportunity of helping. I hope some of my remarks will be thought provoking and, if this is so, my purpose has been achieved.

PICKLING SMUT QUICKLY REMOVED

For thorough removal of smut after the pickling operation, use fast-working Oakite Composition No. 24. This heavy-duty Oakite material quickly removes carbon smut and other foreign matter, yet doesn't damage sull coating. Assures you clean wire fabrication. Saves you money by reducing wear on valuable dies. Ask your nearby Oakite Technical Service Representative to show you how Oakite Composition No. 24 can expedice this important job in your plant. Oakite service and literature both FREE!

OAKITE PRODUCTS, INC.
52A Thames Street, New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* CLEANING
MATERIALS • METHODS • SERVICE

DIAMOND TOOLS
by
Paul Grodzinski

PRICE $5.00

This book is concerned with industrial diamonds and other precious stones. It gives information about their production and qualities, their cutting and uses and, of course, devotes considerable space to the use and manufacture of diamond dies for wire drawing. One chapter is devoted to diamond powders.

Besides being profusely illustrated, there are many reference tables providing much useful data. An effort has been made to treat every phase of the subject in a practical and helpful manner. If you are making diamond dies or tools, or using them, you cannot afford to be without this book.

You may order it from this office. Just send check or order to:

WIRE & WIRE PRODUCTS
300 Main Street Stamford, Conn.

ACID AND ALKALI PROOF
LININGS AND MORTARS

ACID PROOF
CONSTRUCTION

THE CEILCOTE CO.
Consulting and Research Engineers
750 ROCKEFELLER BLDG.
CLEVELAND, OHIO

NOW IN STOCK
French Diamond Dies
IN CAPILLARY SIZES
made by
Etablissements Jos. Vianney
Trevoux, France

Famous Wire Drawing Diamond Dies

.0004	.001
.00045	.0011
.0005	.0012
.00055	.0013
.0006	.0014
.00065	.0015
.0007	.0016
.00075	.0017
.0008	.0018
.00085	.0019
.0009	.002
.00095	and up

.0004 to .072 in stock for quick delivery

VIANNEY WIRE DIE WORKS
250 E. 43rd St., New York, 17
Víctor J. Boulin, Manager

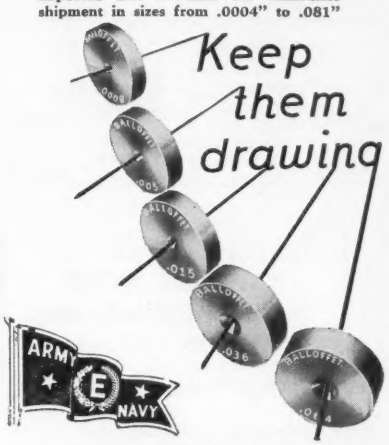
A Review of Inhibitors

(*Continued from page 674*)

	discusses inhibitors and inhibitor theories.
1929	Imhoff, Wallace G., "Pickling of Iron and Steel." A book published by The Penton Publishing Co., Cleveland, O. Covers the whole field of pickling practice. Chapter VIII covers Compounds and Inhibitors.
no date	Blackburn, Paul V., "The Theory and Practice of Pickling." INCO, Vol. VIII, No. 1. Inhibitors.
no date	Black and White; November. "Rationalizing the Pickling Process." Inhibitors, page 29.
1930 Feb.	Evans, U. R. and Stockdale, J. Protecting Iron During Acid Pickling. Metals & Alloys, Feb. 1930, v. 1, p. 377.
1930 March 1	U. S. Navy Department Specification 51-1-2. "Inhibitors Pickling."
1930 Sept. 25	STEEL. Pickling. Perfect Pickling Acid Unharmful to Steel. v. 87, No. 13, p. 52 Acid and Inhibitor combined.
1930	Egloff, G. and Farragher, W. F. Stabilization of Knock Rating Gums, and Color of Gasoline by Chemical Inhibitors.
1931 April	Wire and Wire Products. Grasselli Inhibitor in Metal Pickling. April 1931. pp. 143-44.
1931 Dec.	Wire and Wire Products. Inhibitor; Cleaning Process Uses Thin Lead Film. December 1931, pp. 492, 493. Lead depositing process of Bullard Co., Bridgeport, Conn. Lead plates anodes; sol. Temp. 150-170 degrees F. leadchloride-sulphate bath.
1932	A. S. T. M. Part 11, v. 32, p. 293. Effect of Embrittlement.
1932 March 3	The Iron Age. "Modern Pickling" — Results Achieved with Acids and Inhibitors Reviewed. p. 548. Address by O. L. Thomas, Grasselli Chemical Co., American Society for Steel Treating, Hartford, Conn. meeting.
1932 Sept.	Winterbottom, A. B., and Reed, J. P. Scale Removal by Acid Pickling, Iron & Steel Inst. No. 14, Sept. 1932. 27 pages.
1933 March 9	The Iron Age. "Muriatic Acid Inhibitors." Page 399. Duclean developed by The Grasselli Chemical Co.
1933 Sept.	Meek, Milton. Restrainers or Inhibitors. Wire and Wire Products, p. 265, Sept. 1933, p. 282.
1933 Sept. 18	STEEL. "Pickling and Pasivating." p. 25.
1933 Oct.	Spruance, F. P. "Inhibitors." Wire and Wire Products, page 328.
1933 Nov.	Blackall, A. C. "Effects of Pickling on Carbon Steel Wire." Wire and Wire Products, p. 366. (5) The use of inhibitors or restrainers in the solution.
1934 May 3	Hobbs, H. C. "Pickling of Iron and Steel." The Iron Age, page 19. Inhibitors, page 74.
1934 June 14	Hobbs, H. C. "Today's Pickling Practice in Iron and Steel." The Iron Age, page 12.
1934 Sept. 17	STEEL. "Inhibitor Requirements," etc., p. 42.

Balloffet
DIAMOND DIES

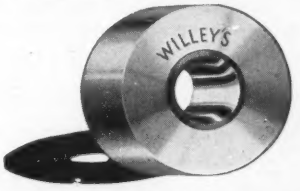
Large stock on hand of domestic and imported dies available for immediate shipment in sizes from .0004" to .081"



Quality Diamond Dies since 1870

BALLOFFET
DIES AND NOZZLE CO., INC.
68-25 Adams at 68th Street
Guttenberg, New Jersey
Union 3-3155

For Best Results Use
WILLEY'S
TUNGSTEN CARBIDE DIES



- WIRE DRAWING
- EXTRUSION
- SIZING

They have exceptional abrasion resistance, are free from porosity and take a high polish. Standard one-piece round dies from stock in many sizes. Four classifications from blank and rough cored nibs to finished dies, ready to use.

WRITE FOR CATALOG
Full information on all sizes and classifications.
Sales Engineers in Principal Cities

WILLEY'S
CARBIDE TOOL CO.
MANUFACTURERS AND SPECIALISTS IN
TUNGSTEN CARBIDE TOOLS
1340 W. VERNOR HIGHWAY • DETROIT, MICHIGAN

DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL AJAX SUPPLIES INC.
R.R. 4, P.O. Box 66, Ft. Wayne 1, Indr

NEW ENGLAND WIRE DIE CO.
7 Forsberg St., Worcester, Mass.
EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWERS
Eastern Representative of
Ajax Industrial Supplies, Inc.

DIAMOND AND CARBIDE WIRE DRAWING DIES
RUSCH WIRE DIE CORPORATION
Croton-on-Hudson, N. Y.

DIAMOND WIRE DRAWING DIES
INDIANA WIRE DIE COMPANY
314-324 E. Wallace St.,
Fort Wayne, Indiana

DIAMOND DIES
.000's to .102
Fort Wayne Wire Die Co.
2625 E. Pontiac St. Fort Wayne, Ind.

Diamond Dies for Wire Drawing
Wayne Wire Die Company
200 Pennsylvania Ave.
Hillside, N. J.
ELizabeth 2-2456

Wire Drawing Diamond Dies

COCHAUD
WIRE DIE CORPORATION
300 W. 56th St., NEW YORK
Tel. Col. 5-1340

EDITOR'S NOTE

The steel industry is desperately short of scrap. The mills must keep running to provide our national standard of living.

Get your scrap into the market quickly. Keep it moving and don't let it accumulate. The time is short and this problem unsolved and neglected will injure all of us. Do your part.

1935 June 17 STEEL. "A-C Electric Pickling System Involves Use of Organic Addition Agent." Page 55.

1935 October Metal Cleaning and Finishing. Pickling Inhibitors. October 1935, pages 513-520.

1936 Feb. Metal Cleaning and Finishing. Inhibitors, p. 83.

1936 Feb. 3 STEEL. "Inhibitors Protects Steel." p. 60.

1936 April 30 The Iron Age. "Electrochemists Review Action of Inhibitors." p. 42. 69th meeting Electrochemical Society in Cincinnati, Ohio.

1936 May Evans, U. R. Metal Cleaning and Finishing. Inhibitors. p. 255. Part 11—Same June 1936, p. 313.

1936 Oct. 19 STEEL. "Removes Rust Efficiently."

1936 Fairlie, Andrew M. Sulfuric Acid Manufacture. p. 75. Reinhold Publishing Corp., 330 W. 42nd St., N. Y.

1936 Bablik, Heinz. "Galvanizing," p. 48; Pickling Additions. Engineers Book Shop, 168 East 46th St., New York 1936.

1937 American Chemical Paint Company. "Pickling Made Efficient with Rodine." Bull. No. 13.

1937 E. F. Houghton & Co., "Pickling with Modern Inhibitors." Describes Acidtrol No. 100. Discusses Inhibitors generally. Gives Electrolytic Theory of Inhibiting.

1937 Nov. Machu, Willy. "The Efficiency of Organic Inhibitors during Pickling of Iron." Metal Industry, page 569.

1939 Burn, R. M., and Schuh, A. E. "Protective Coatings for Metals." Inhibitors pp. 158, 381, 377, 23, 61, and 22. Reinhold Publishing Corp., New York.

1940 Oakite Products, Inc., 22 Thames St., New York. Oakite Pickle Control. Described in small 12-page booklet, "Pickling."

1940 Francis, C. B. "The Making, Shaping, and Treating of Steel." Inhibitors, pp. 1188, 1189. Book published by The Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

1940 Zepffe, C. A. and Faust, L. L. Metallurgical Aspects of Hydrogen in Electroplating." Proceedings of the Educational Sessions of the American Electroplater's Society. (1940) pp. 1-20.

1940 Towner, O. T. Pickling of Metals for Electroplating. Proceedings of the Educational Sessions of the American Electroplater's Society (1940).

1940 Sept. Industrial Gas. "Corrosion Inhibitors." Page 21.

1940 Oct. 28 STEEL. "Pickling Inhibitor," p. 70. From a paper presented in Sheet Metal Industries, Sept. 1940.

1940 Nov. Industrial Gas. "Domestic Out-of Thiourea." Page 6.

1941 May 29 ApRoberts, James P. "Still Tank Pikling." The Iron Age, p. 37. Nine references.

1942 Oct. Metal Finishing. "Agent for Bright Pickling." p. 544. "Surbrite" developed by Hanson-Van Winkle-Munning Co., Matawan, N. J.

1943 March Metal Finishing. "Pickling Accelerators." Under Shop Problems, p. 149; also same on page 150, "Pickling Steel."

1943 March Henricks, John A., "An Interpretation of the Mechanism of Bright Electroplating." A paper presented at the 82nd General Meeting of the Electrochemical Society at Detroit. Metal Finishing, March 1943, p. 134; and April 1943.

1943 Oct. Tatnall, Rodman R., "Hydrogen Brittlenes in Spring Steel." Wire and Wire Products, page 607.

1944 Taylor F. Iron and Steel 17, p. 525.

1944 American Chemical Paint Company. "Efficient Pickling with Rodine." Bull. No. 13. Revised.

1944 Oct. Spruance, F. P. "Cleaning-house Practice." Wire and Wire Products, Page 671.

1944 Nov. Brown, Richard E. Notes in Convention Technical Papers. Wire and Wire Products. Nov. 1944, p. 777.

★ ★ ★

DIAMOND CARBIDE DIES
KELLY
WIRE DIE CORPORATION
19 W. 34th St. New York

Shelldraw
COMPOUNDS
EASILY REMOVED SOLUBLE PASTES FOR WIRE DRAWING
SHELL

SLEEPER & HARTLEY, Inc.
Designers and Builders
SPRING COILERS
WIRE WORKING MACHINERY
WIRE MILL EQUIPMENT
SPECIAL MACHINERY
Address Inquries to
Box 1249
WORCESTER, MASS.

S-M-T
CARBIDE & TANTUNG
SPRING FORMING TOOLS
State Machine Tool Co.
190 State St.
Hartford 3, Conn.

TORRINGTON
SPRING COILERS
14 models in both segment and clutch types for rapid, automatic, accurate production using wire diameters .003" to .750". Torsion and other attachments available for increasing utility of Torrington Coilers
The TORRINGTON MANUFACTURING CO.
TORRINGTON, CONNECTICUT

Designers and Builders of Gas-Fired Heat Treating Furnaces for Ferrous and Non-Ferrous Wire.
SURFACE COMBUSTION CORP.
Main Plant & General Offices:

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frames, Wire Pointers — Puller Tongs.
General and heat resisting alloy castings for wire mill use.
Circulars on Request.
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

1944 Dec. Blast Furnace and Steel Plant. "Molasses, Salt, Corn, Soap, and Bran in the Making of Steel." p. 1488.
1945 January Spruance, F. P. "Cleaninghouse Practices." Wire Assoc. Proceedings. Session Tuesday Oct. 17, 1944. Wire and Wire Products. January 1945, p. 45.
1945 May 3 The Iron Age. "Acid Inhibitor." p. 68. Discusses Pennsalt PM-40 Inhibitor.
1945 June Metal Finishing. "Pickling Agent" Troxide. Marketed by Waverly Petroleum Products Co., Phila., Pa.
1945 June Organic Finishing. "Acid Inhibitor." pp. 56-57.
1945 July Metal Cleaning and Finishing. "Pickling" page 296. Pickling Steel Shackles and Turnbuckles.
1945 August Metal Finishing. "Pickling Inhibitor." p. 349. Discusses "Kelite Control." Developed by Kelite Products, Inc., Los Angeles, California.
1945 Sept. 20 The Iron Age. "Pickling Agent." Also pickling inhibitor, "Kelite Control."
1945 October Metal Finishing. "Thiourea in Acid Copper Plating Solutions" by Walter Brenner and Dr. C. B. F. Young. pp. 76 to 90.
no date The Ethone Co., New Haven, Conn. "Modern Pickling of Iron and Steel." Covers pickling generally Uses of Acid Addition Agent, page 5; also small pamphlet.
1946 Jan. Organic Finishing. Acid Inhibitor. p. 9.
1946 Feb. Zapffe, Dr. Carl A., "The Behavior of Hydrogen in Steel During Pickling." Wire and Wire Products, p. 149. Bibliography with 46 references.
1946 May Metal Finishing. May 1946, page 26. Pickling Inhibitor. Two patents granted to W. H. Hill; U. S. Pat. 2, 394,773 and U. S. Pat. 2, 394,774.

Shot Peening and Its Importance to the Spring Industry

(*Continued from page 667*)

advantage of insuring perfect coverage for each spring. Machines in which the material to be peened is tumbled while under the blast, are not recommended for spring peening. The reason for this is that, in the case of coil springs, insufficient coverage is obtained on the springs at the ends of the barrel (it is necessary in peening that all pieces obtain an equal blast if uniform results are to be obtained) and leaf springs are to be peened on the tension side only. This of course would be impossible in a barrel type machine where they are constantly turning over and over while under the blast.

* * *

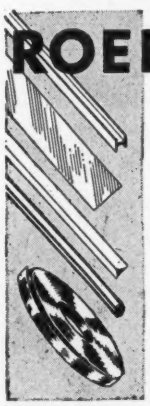
ANOTHER type of machine that has been used in peening

SPECIALISTS
IN
WIRE DRAWING
LUBRICANTS
APEX ALKALI PRODUCTS COMPANY
MAIN AND RECTOR STS. • PHILADELPHIA 27, PA.

Wire Drawing Machinery
Featuring —
High Speed Upright Cone Machines.
Also —
Bull Blocks and Benches, Continuous Wire Drawing Machines, Spoolers, Pointers, String-up Machines, etc.
And —
Cold Heading Machinery.
WATERBURY FARREL FOUNDRY & MACHINE CO.
Waterbury, Conn.

SPECIALISTS IN
DRAWING COMPOUNDS
and
SOAP POWDERS
for
WIRE DRAWING
Established in 1906
NEIL C. POTTER
24 COMMERCE ST.
NEWARK 2, N. J.

WIRE ANNEALING FURNACES and PROCESSES
COIL LOADING and STRIPPING MACHINES—WIRE SPIDERS
LEE WILSON ENGINEERING CO., INC.
Cleveland, Ohio • ACademy 4670

ROEBLING

ROUND
FLAT
SHAPED
WIRES and
STRIP STEEL
JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, N. J.

Specify SAUEREISEN
ACIDPROOF CEMENTS—COMPOUNDS
FOR
Tanks, Sewers, Stacks, Floors
Technical cements for all purposes.
Send sketches or samples
Sauereisen Cements Company • Pittsburgh 15, Penna.

Wire Forming Machinery
Standard and Special Designs
E. R. SEIFERT, Inc.
202 S. Beech St., Syracuse, N. Y.

• PICKLING TANKS
• PLATING TANKS
• ANODIZE TANKS
HEATING UNITS FOR ACID TANKS
HEIL PROCESS EQUIPMENT
COMPANY
12901 Elmwood Ave. Cleveland 11, Ohio

TESTING MACHINES
for WIRE, RUBBER, PAPER, TEXTILES, etc.
SCOTT TESTERS, INC.
55 Blackstone St. • Providence, R. I.
"Standard of the World"

SPECIALISTS IN
FINE WIRE
North American Philips Co., Inc.
100 East 42nd Street, New York 17, N. Y.
Norelco ELECTRONIC PRODUCTS

DI-ACRO Bender No. 1
forms round, flat or square wire to accurately duplicated shapes.
O'Neil-Irwin Mfg. Co.
303 - 8th Ave. S.
Minneapolis 15, Minn.
Send for Catalog

ACID PROOF BRICK
for
Pickling Tank Construction
Toronto Acid Brick
KEAGLER BRICK CO.
STEUBENVILLE, Ohio

CONSULTANT AND SPECIALIST
DRAWING LUBRICANTS
Hans C. Bick, Inc.
READING, PA.

work is the rotating table. This type of machine is best adapted to small flat work and is not recommended for the peening of springs.

Operating Hints

IN the successfull operation of any peening process there are several other factors which must always be kept in mind. These are shot break-down, shot separation, and dust collection.

* * *

SHOT break-down is the breaking of the shot as a result of striking the surface to be peened. There are several disadvantages to the use of broken shot, the most important of which is the fact that as the shot size decreases, the impact energy of the shot will also decrease. The reason for this is that the weight of the shot has decreased and even though it is traveling at the same rate of speed its momentum is less and it will not have nearly as great an effect as the full-size shot. When this happens intensity of peening drops off and unsatisfactory fatigue properties are the result. Another disadvantage is that broken shot will leave sharp nicks and scratches on the surface of the metal instead of the smooth, round indentations obtained by solid shot. These sharp pits have an adverse effect on the fatigue life.

* * *

SHOT break-down has been shown to be a fatigue process and varies directly with shot velocity and the number of times of impact. From an economy point of view it is, of course, desirable to obtain as great a number of impacts for each shot before it breaks down as is posible. The number of impacts a single shot will withstand without breaking increases rapidly as the shot velocity is decreased. In many installations a shot velocity far in excess of that necessary to obtain the desired peening effects is used.

* * *

THE peening effect or intensity increases as the shot velocity increases however the break-down rate increases much more rapidly. In all cases the procedure to follow is to first determine the peening in-

NEP • SUMFOAM
ACID INHIBITOR • PICKLING COMPOUND
THE WM. M. PARKIN CO.
HIGHLAND BLDG. PITTSBURGH 6, PA.

HAVEG CORPORATION
NEWARK, DELAWARE
•
Manufacturers of Plastic Chemical Equipment

HEADQUARTERS FOR PROCESSING MACHINERY FOR THE WELDING ROD INDUSTRY!
Place your orders now for Postwar equipment
MOSLO MACHINERY COMPANY
2443 Prospect Ave. Cleveland 15, Ohio

Annealing Pots and Boxes
Galvanizing Kettles
Lead and Spelter Pans
Pressure Vessels
National Annealing Box Co.
Established 1895
Washington, Penna.

RUESCH
Machinery For
Wire, Tube, and Brass Mills
409 Mulberry St., Newark, N. J.

ZINC WIRE
THE PLATT BROS. & CO.
WATERBURY, CONN.

Wire Measuring
PRODUCTIMETERS
Precision-built for accuracy and speed. Most complete line offered.
SEND FOR CATALOG No. 3
DURANT MANUFACTURING CO.
1918 N. Buffum St. Milwaukee 1, Wis.
118 Orange St. Providence 3, R. I.

WATERPROOF
and
CREPE PAPER
in rolls of any size for wrapping coils and reels.
CREPE-KRAFT BARREL LINERS
THE CREPE-KRAFT COMPANY
Tel.: Market 2-0375
112 Adams St. Newark, N. J.

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS
Suite 438, 815 — 15th St., N. W.
Washington 5, D. C.

United States and Foreign Patents Secured. — Trade-marks and Copyrights Registered
Searches made to determine Patentability and Validity.
Patent, Trade-mark and Unfair Competition Causes.

KENNETH B. LEWIS
CONSULTING ENGINEER
Wire Mill Equipment, Layout and Practice
43 Midland St., Worcester, Mass.
Phone: Worcester 5-6033

L. D. WIEL
WIRE MILL CONSULTANT
Former Plant Manager
Practical Advice
Room 1530, 42 Broadway, New York 4, N. Y.
Telephone: White Hall 4-5307

C. RAYMOND SYER
Consulting Finishing Industrial Engineer
Tel. 2-4268, 2-2709
P. O. Box 31, Westport, Conn.

WIRE WORKING MACHINERY
National Automatic Wire Nail Machines
1 Torrington Tandem Rolling Mill M.D.
2 Torrington No. W-24 Spring Coilers M.D.
2 Waterbury Step Cone Drawing Machines.
3 Nilson 4-slide Wire Forming Machines.
2 Shuster Shaped Wire S & C Machines.
8 Shuster Round Wire S & C Machines.
NATIONAL MACHINERY EXCHANGE
128-138 MOTT ST. NEW YORK, N. Y.

MACHINERY WANTED
Wire Drawing machine for continuous wet drawing of fine steel wire.
Reply Box # 438
WIRE & WIRE PRODUCTS

ROSS WIRE • ROD OVENS
J. O. ROSS ENGINEERING CORP.
350 Madison Avenue, New York 17, N. Y.
CHICAGO • BOSTON • DETROIT

FOR YOUR SPOOLS AND REELS
Patented all-steel electro-welded Drawing and Annealing and patented metal-bound shipping spools and reels.
Hubbard Spool Company
1624 Carroll Avenue, Chicago, Illinois

tensity desired; second, determine the production rate necessary; and third, select the slowest shot velocity that will give these two effects.

* * *

A CERTAIN amount of shot break-down will occur, however and it is imperative that this broken shot be removed. It is not enough to merely dump fresh shot into the hopper because it has been found that the shot does not mix thoroughly and the result of doing this will be a large variation in intensity of peening.

* * *

SHOT separation can be accomplished by several means, the most popular of which is the use of an air current which separates the shot according to its mass. This current of air passing up through the shot is regulated so that it will remove particles of a weight lighter than the smallest full size shot. This removes all the fines and dust and leaves the whole shot to go through the process again. Efficient shot separation is a "must" in order to obtain the most effective peening operation.

* * *

IN order to obtain a stable operating condition, it is necessary to have a rationing device of some kind to add fresh shot into the system at the same rate that broken shot is removed.

* * *

A DUST collector should be incorporated with the shot separator so that the fines and dust are carried off as soon as they are formed.

* * *

AD THOUGHT

Do you regularly study our ADVERTISING pages?

Many of our readers have told us they consider them as important as the editorial articles. Ads often contain important new information on products, machinery, equipment and supplies—they ALWAYS serve as reminders of things that you need or will be needing for the successful conduct of your business.

May we suggest, therefore, that reading the ads be made a regular habit. And when you write to an advertiser for information, it helps us and identifies your inquiry to say you saw the ad in WIRE AND WIRE PRODUCTS. Will you please do this?

Talide
Talide Dies, made of the hardest metal known, stay on the job longer ... production is profitable and continuous ... eliminates scrap ... mirror-like dies impart higher finish.
METAL CARBIDES CORPORATION
YOUNGSTOWN 5, OHIO

FOR SALE
Eight (8) Woolford Wood Pickling Tanks, made from 3¾" finished thickness Long Leaf Yellow Pine, with 1¼" T. & G. Yellow Pine Lining, rodded with ¾" diameter B. & M. Acid resisting bronze rods, nuts and washers, 5 ft. 6 in. long x 4 ft. wide x 4 ft. deep. Two tanks new condition, four excellent condition, two good condition, watertight.
THE GILBERT & BENNETT MFG. CO.
Georgetown, Conn.

WIRE STRAIGHTENING CAPACITY AVAILABLE
We have available wire straightening equipment for straightening and cutting round wire from ⅛" up to ½" in diameter, and up to 33' in length.
Submit details for quotation
Capitol Steel Corp. of New York,
15 Park Row, New York 7, N. Y.

VAUGHN NINE DIE CONTINUOUS WIRE DRAWING MACHINE, STARTING WITH RODS. HIGH PRODUCTION UNIT EXCELLENT CONDITION.
NATIONAL MACHINERY EXCHANGE,
138 MOTT STREET, NEW YORK, N. Y.

FOR SALE
One (1) C. W. Hunt Co. Electric Storage Battery Locomotive, 4 ton, with recent 44 cell Exide Ironclad Battery; 13 wire mill oven cars 3 x 6 ft. good condition; 21 miscellaneous cars fair condition; several hundred feet of used 20-lb. rail fair condition, 21½" gauge.
THE GILBERT & BENNETT MFG. CO.
Georgetown, Conn.

WANTED — PLANT MANAGER
for "up and coming" copper wire processing mill located in Upstate New York.
To the man with a keen desire to grow rapidly and who has abundant experience in fine wire drawing, tinning, annealing, enamelling, testing and who takes pride in quality production, an excellent opportunity is offered by a well managed, sound corporation with fine connections.
Submit qualifications, references and personal data for interview.
Reply Box # 439
WIRE & WIRE PRODUCTS

CLEVELAND TRAMRAIL
Division of
THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE, OHIO
Leading manufacturers of
OVERHEAD MATERIALS HANDLING EQUIPMENT
for the Wire and Wire Products Industry

Index To Advertisers

A

Ajax Industrial Supplies, Inc. 700
Aluminum Company of America 651
American Chemical Paint Co. 695
American Insulating Machinery Company 697
Apco Mossberg Company 696
Apex Alkali Products Co. 701

B

Balloffet Dies & Nozzle Co., Inc. 699
Bethlehem Steel Co. 642
Bick. Hans C., Inc. 702
Brady, W. S. Co. 692
Broden Construction Co., Inc., The.....Inside Front Cover

C

Carboloy Company, Inc. 641
Carl-Mayer Corp., The 691
Ceilcote Company, The 699
Cleveland Tramrail Division of the
Cleveland Crane & Engineering Co. 703
Cochaud Wire Die Corporation 700
Continental Steel Corporation 696
Crepe-Kraft Co., The 702

D

Davis, R. L. Electric Co. 685
Durant Mfg. Co. 702
Du Pont, E. I. de Nemours Co. 655

E

Eisler Engineering Co. 696
Electric Furnace Company ..... Back Cover
Emory, Robert J., Company 693
Entwistle, James L., Co. 659

F

Firth-Sterling Steel Company 664
Fort Wayne Wire Die Co. 700
Furnace Engineers, Inc. 645

G

Glader, Wm., Machine Works 684

H

Haveg Corporation 702
Heil Process Equipment Corp. 702
Hubbard Spool Company 703
Hudson Wire Co. 648

I

Indiana Wire Die Company 700
Industrial Oven Engineering Co. 688
International Nickel Company 644

J

Johnson Steel & Wire Co., Inc. 691
Jones & Laughlin Steel Corporation 668

K

Keagler Brick Company 702
Kelly Wire Die Corporation 700
Keystone Steel & Wire Co. 683

L

Lancaster, Allwine & Rommel 703
Lewis, K. B. 703
Lewis, Machine Co., The 696

M

Magnus Chemical Co. 649
Metal Carbides Corporation 703
Michigan Wire Die Co. 692
Micro Products Company 680
Miller, R. H. Company, Inc. 697
Morgan Construction Company 662
Moslo Machinery Company 702
Mossberg Pressed Steel Corp. 686

N

National Annealing Box Co. 702
National Machinery Exchange 703
New England Butt Company 646
New England Wire Die Co. 700
North American Philips Co., Inc. 702
Norton Company, The 694

O

Oakite Products, Inc. 698
O'Neil-Irwin Mfg. Co. 702

P

Parkin, Wm. M., Co. 702
Platt Brothers & Co., The 702
Porter, H. K., Inc. 698
Potter, Neil C. 701
Procter & Gamble 698

R

Reynolds Wire Corp. 657
Robertson, John Co., Inc. 654
Roebling's, John A., Sons Company 701
Roos, H. & G., Tool & Mfg. Co. 695
Ross, J. O., Engineering Co. 703
Royle, John & Sons 687
Ruesch, H. J., Machine Co. 702
Rusch Wire Die Corporation 700
Rustless Iron & Steel Division, American Rolling
Mill Company 643

S

Sauereisen Cements Co. 702
Scott Testers, Inc. 702
Scudder, E. J., Foundry & Machine Co. 701
Seifert, E. R., Inc. 702
Shell Oil Co., Inc. 701
Shuster, F. B., Mfg. Co., The 682
Sleeper & Hartley, Inc. 701
Standard Industrial Compounds Co. 647
Standard Machinery Co. 694
Standard Varnish Works 652
State Machine Tool Co. 701
Stevens Metal Products Co., The 663
Surface Combustion Corp. 701
Syer, Raymond C. 703
Syncro Machine Company 656

T

Torrington Mfg. Co., The 701

V

Vascoloy-Ramet Corp. 653
Vaughn Machinery Co. ..... Front Cover
Vianney Wire Die Works 699

W

War Assets Corporation 650
Waterbury Farrel Foundry & Machine Co. 701
Watson Machine Company ..... Inside Back Cover
Wayne Wire Die Co. 700
Wiel, L. D. 703
Willey's Carbide Tool Co. 699
Wilson, Lee, Engineering Co., Inc. 701
Wire & Textile Machinery, Inc. 697

Y

Youngstown Sheet & Tube Company 658

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

ACID-PROOF CONSTRUCTION—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Heil Process Equipment, Corp., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

AIR DRAW FURNACES
Carl-Mayer Corp., Cleveland, Ohio.

ALKALINE CLEANERS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J

ARMORING EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

BENDERS—
O'Neil-Irwin Mfg. Co,. Minneapolis,. Minn.

BOBBINS—Braider & Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

BORON CARBIDE
Norton Co., Worcester. Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Pawtucket, R. I.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn..

BRICKS—Acid Proof
Keagler Brick Co., Steubenville, Ohio.

CABLE LACQUERING OVENS
Industrial Oven Engr. Co., Cleveland, O.

CABLE—Steel and Copper
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.

CEMENTS—Acid Proof
Sauereisen Cements Co., Pittsburgh, Pa.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Broden Construction Co., Cleveland, Ohio.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

CLOTH TESTERS—
Scott Testers, Inc., Providence, R. I.

CLOTH—WIRE. All Metals
Reynolds Wire Co., Dixon, Ill.
Roebling's John A. Sons, Co., Trenton, N. J.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, Ohio.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J. Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

COLD HEADERS—
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Shell Oil Co., Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila, Pa.
Oakite Products, Inc., New York, N. Y.
Shell Oil Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Shell Oil Co., Inc., New York, N. Y.
Standard Industrial Compounds, Co., Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago. Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside. N. J.

DIAMOND POWDERS—
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND TOOLS—
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Lead Extrusion
Wayne Wire Die Co., Hillside, N. J.
Robertson, John, Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
New Eng. Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Works, Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E J. Fdry. & Mach. Co., Trenton, N. J.
Standard Machinery Co, Providence, R I.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Hubbard Spool Company, Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING & PRE-HEATING ROOMS—
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass
Syer, C. Raymond, Westport, Conn.
Wiel, L. D., New York, N. Y.

EQUIPMENT—Insulation Testing
Davis, R. L., Elec. Co, Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I

EYELETS—Brass or Zinc
Platt Bros., & Co., The, Waterbury, Conn.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Oven Engr. Co., Cleveland, Ohio.

WHERE TO BUY, Continued

FURNACES—Annealing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Galvanizing Equipment
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Salth Bath
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, O.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING KETTLES—
National Annealing Box Co., Washington, Penna.

GOVERNMENT SURPLUS MATERIALS
War Assets Corporation, New York, N Y.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of Cleveland.
Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
Industrial Oven Engr. Co., Cleveland, O.

INSULATING MATERIALS—
Crepe-Kraft Co., Newark, N. J
Du Pont de Nemours, E. I. C., Wilmington, Del.
Standard Varnish Wks., Staten Island, N. Y.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Entwistle, Jas. L. Co., Pawtucket, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Coilers
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Mach'y Co., Phila, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila, Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Inc., Cleveland, Ohio.
National Mach'y Exch., (Used), New York, N.Y.
Porter, H. K. Inc., Everett, Mass.
Shuster, F. B. Mfg., Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co. Montclair, N.J.
Union Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging
Broden Construction Co., Cleveland, Ohio.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Oven Engr. Co., Cleveland, O.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
Robertson John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.

MACHINERY—Fence
Broden Construction Co., Cleveland, Ohio.
Glader, Wm. Machine Works, Chicago, Ill.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
Eisler Engineering Co., Newark, N. J.
National Mach'y Exch. (Used), New York, N. Y.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Seifert, E. R., Inc., Syracuse, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co, Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail, Div. of the Cleveland.
Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Broden Construction Co., Cleveland, Ohio.
Glader, Wm. Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.

WHERE TO BUY, Continued

MACHINERY—Pointing
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.

MACHINERY—Rubber for Insulating Wire
Royle, John & Sons, Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila, Pa.
Broden Construction Co., Cleveland, Ohio.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I. (Special Designs).
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, Ohio.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Swaging
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L., Elec. Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.

MACHINERY—Testing Spring
Standard Machinery Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Industrial Oven Engr. Co., Cleveland, O
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila, Pa.
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J .

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Procter & Gamble, Cincinnati, Ohio.
Shell Oil Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Industrial Oven Engr. Co., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Maass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D.C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

PIPES & FITTINGS—Acid Resistant
Ceilcote, Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

POTS—Lacquer
Industrial Oven Engr. Co., Cleveland, O.

POTS—Lead Melting
National Annealing Box Co, Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co,. Phila, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I. (Mechanical Only)

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REEL AND TENSION STAND—
Industrial Oven Engr. Co., Cleveland, O.
Moslo Machinery Co., Cleveland, Ohio.
Sleeper & Hartley, Inc, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

WHERE TO BUY, Continued

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Stevens Metal Products Co., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N.Y.

RODS—Nickel Alloy
International Nickel Co., Inc., New York, N. Y.

RODS—Stainless Steel
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROLL STRAIGHTENERS—
Moslo Machinery Co., Cleveland, Ohio.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Heil Process Equipment Corp., Cleveland, Ohio.
Standard Industrial Compounds Co., Chicago, Ill.

SATURATION SYSTEMS
Industrial Oven Engr. Co., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Procter & Gamble, Cincinnati, Ohio.
Shell Oil Co., Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Oven Engr. Co., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company,. Chicago, Ill
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

SPRINGS—Tools for Forming
State Machine Tool Co., Hartford, Conn.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.

TANK—Compound
Haveg Corp., Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Penna.

TAPES—Self Sticking
Brady, W. S. Co., Milwaukee, Wis.

TESTING INSTRUMENTS—
Davis, R. L., Elec. Co., Wallingford, Conn.

TOOLS—Spring Forming
State Machine Tool Co., Hartford, Conn.

TOOLS—Wire Cutting
Porter H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe. O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio.

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

TREADS—Safety
Norton Co, Worcester, Mass.

TUBE BENDERS AND FORMERS—
Ruesch, H. J. Machine Co., Newark, N. J.

TURKS HEADS—Friction and Power
Standard Machinery Co., Providence, R. I.

VALVES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—For Insulation
Standard Varnish Wks., Staten Island, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y Co., Phila, Pa.
Davis, R. L., Electric Co., Wallingford, Conn.
Entwistle, James L. Co., Pawtucket, R. I.
Industrial Oven Engr. Co., Cleveland, O.
Watson Machine Co., Paterson, N. J.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.

WIRE—Enameled for Coils
North American Philips Corp., Dobbs Ferry, N.Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Reynolds Wire Co., Dixon, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
Johnson Steel & Wire Co., Inc., Worcester, Mass.

WIRE—Nickel & Nickel Alloy
International Nickel Co., Inc., New York, N. Y.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.

WIRE—Non-Ferrous to Specification for Special Purposes
Hudson Wire Co., Ossining, N. Y.
North American Philips Corp., Dobbs Ferry, N.Y.
Winsted Div. of Hudson Wire Co., Winsted Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
Firth-Sterling Steel Co., McKeesport, Pa.
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling, John A., Son Co., Trenton, N. J.
Reynolds Wire Co., Dixon, Ill.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Reynolds Wire Co., Dixon, Ill.

WIRE WINDER—
Standard Mill Supply Co., Providence, R. I.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARNS & TAPES
Du Pont de Nemours, E. I. Co., Wilmington, Del.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY
ESTABLISHED 1845
PATERSON 3, NEW JERSEY, U. S. A.

Wire & Wire Products
September, 1946

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

REWINDING — COILING STAND — 54″ SIZE

This unit is widely used in WAREHOUSES and SHIPPING ROOMS, where it is unexcelled for "medium-heavy" Rewinding on Reels and Coiling Heads.

It offers: — both "reeling" and "coiling" in a **minimum of space, extremely rugged and compact construction, ease of installation,** simplest adjustments, control flexibility and adaptability to all manners of winding and coiling applications of products ranging all the way from wire rope, to electrical cables, rubber hose, cordage, et cetera.

CONSTRUCTION

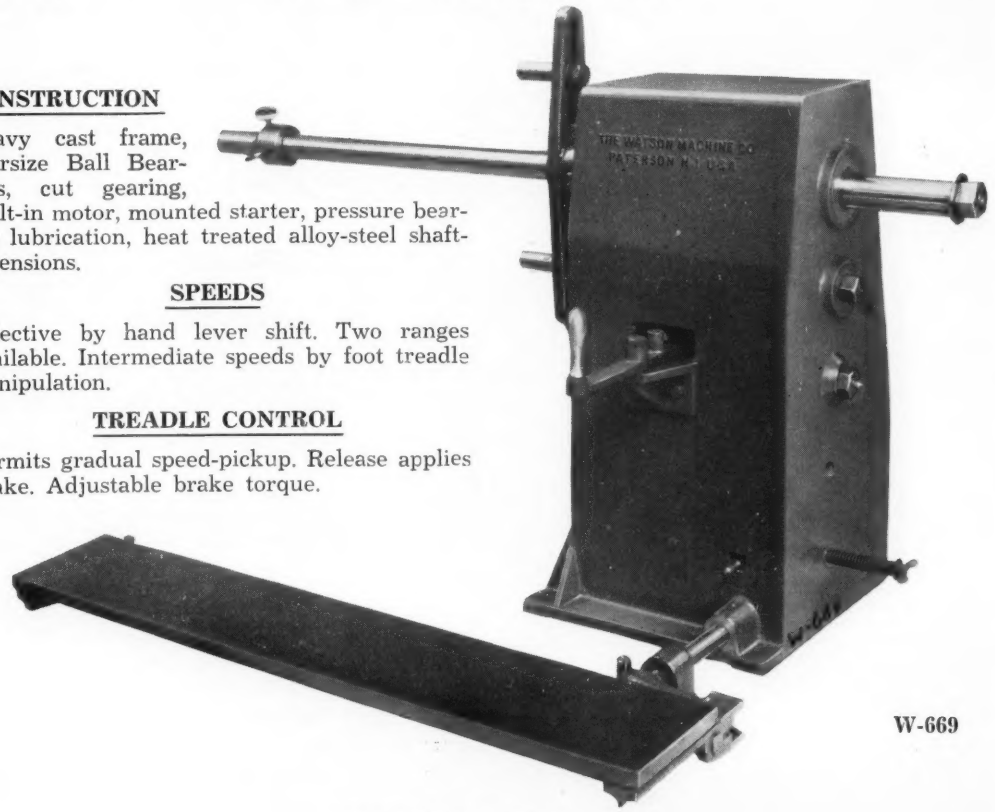
Heavy cast frame, oversize Ball Bearings, cut gearing, built-in motor, mounted starter, pressure bearing lubrication, heat treated alloy-steel shaft-extensions.

SPEEDS

Selective by hand lever shift. Two ranges available. Intermediate speeds by foot treadle manipulation.

TREADLE CONTROL

Permits gradual speed-pickup. Release applies brake. Adjustable brake torque.



W-669

ALLOWABLE REEL LOADS

Will vary with shaft diameter specified. Max. is 2 5/16″ which will safely support a 24″ wide reel of 3000 lb. total weight. Where reel width × weight exceeds allowable figures, a post jack provides outer end support for much heavier loads.

HAND OF ASSEMBLY

"Right Hand" is standard and is shown above, however, we can assemble "Left Hand" with foot treadle and speed change lever on opposite side.

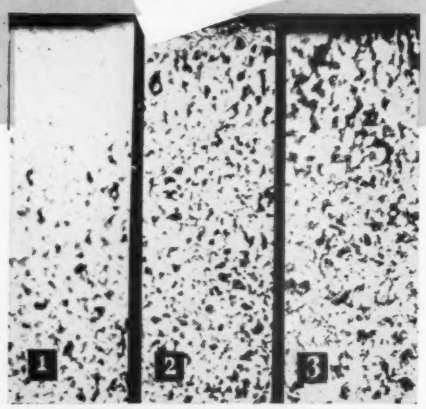
REQUIRED DATA

Prior to submission of proposals, we desire that the following information be submitted to us:

1.—Diameter and free length of reel shaft extension.
2. — Coiling Head data.
3. — Dog pin placing distance, pin diameter and free length.
4. — Electrical current characteristics

Machine Bulletin on request.

Interested in restoring carbon Carburizing or Preventing Decarburization?



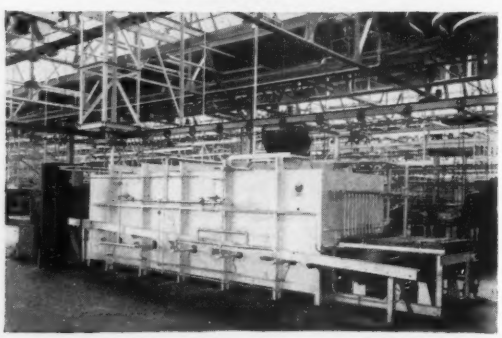
1.—SAE 1035 steel showing decarburization before heat treatment. 2.—Same steel after short cycle heat treatment and carbon restored. 3.—After longer cycle anneal (All photomicrographs 150X).

25 Years Experience Is Available To You

With over 25 years research and practical experience in building successful equipment EF engineers are well qualified to help solve furnace problems involving carbon recovery.

Shown at left is an EF furnace similar to a continuous tube type special atmosphere furnace we developed in 1933, which restored carbon in heat treating shock absorber shafts.

Below is a more recent installation in which carbon is restored to small products made from hot rolled rod.



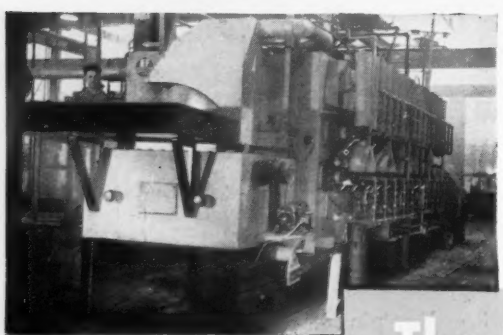
An EF continuous tube type special atmosphere furnace.

Carbon restoration may be accomplished in other EF continuous and batch type furnaces equipped with our special atmosphere control.

Possibly many other furnaces now in operation could be converted for carbon restoration or the skin recovery process.

Whether you are interested in restoring carbon; carburizing; bright hardening or annealing without decarburization; or any other heating or heat treating process, EF engineers are in position to design and build equipment to do the job.

We build production furnaces for handling material in any size, shape or quantity.



An EF gas fired radiant tube furnace heat treating bolts.

We invite your inquiries

ELECTRIC AND FUEL FIRED EF FURNACES

The Electric Furnace Company

SALEM, OHIO

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES . . FOR ANY PROCESS · PRODUCT OR PRODUCTION